PACKAGE engineering

Problems of a new aerosol packaging line

A revealing look at some things a company learns to do and not do when planning, installing, and de-bugging an aerosol packaging operation — with supporting engineering details. (See page 27)

Collapsible tubes vs. their contents

Reviewing some chemical and other factors contributing to the attaining of tube-metal and contents compatibility through use of an appropriate tube lining. (See page 51)

How to write corrugated box specifications

Close scrutiny of basic principles and subtle details going into the development of practical and adequate box spec's — with pertinent illustrative specifications. (See page 56)

Complete table of contents on Page 2

NOVEMBER 1957

VOLUME 2 • NUMBER 11

Stamped and Wrapped

by SCANDIA

HARD-BOX PACKS FOR THE CIGARETTE INDUSTRY

SCANDIA

Manufacturers of Better Packaging Machinery

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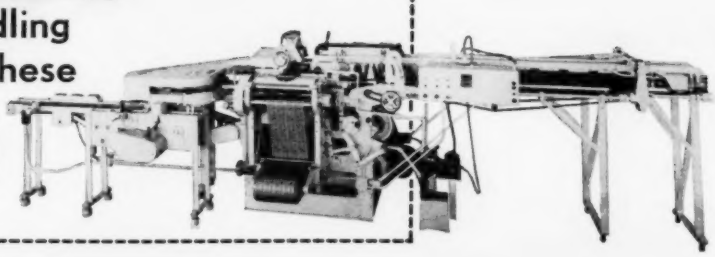

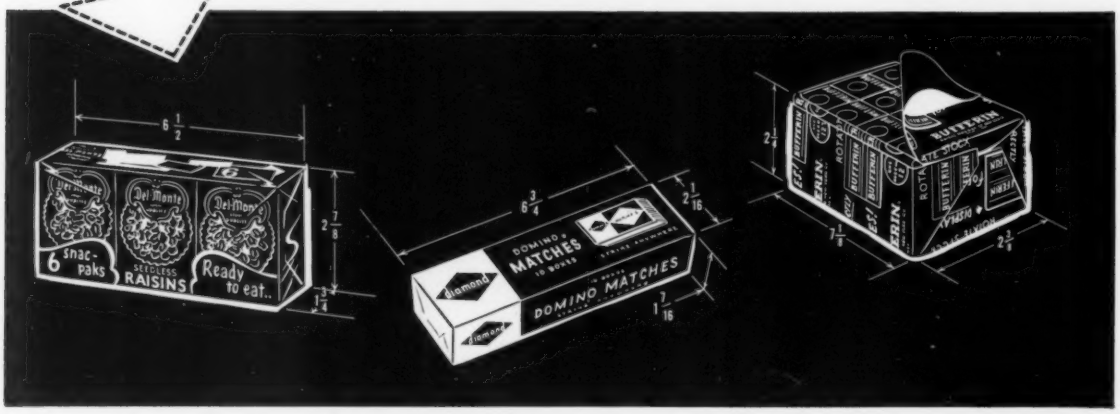

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See us at The Packaging and Materials Exposition, March 25-28, 1958, Atlantic City.

NOVEMBER 1957 • VOLUME 2 • NUMBER 11

PACKAGE engineering

AN ANGUS J. RAY PUBLICATION

For your calendar

November 6-8. AMA Packaging Clinic, How to Control Overfill and Underfill on Powder, Liquid, and Viscous Packaging Filling Equipment, New York. Contact: John A. Warren, American Management Association, 1515 Broadway, New York 36, New York. *Telephone: Judson 6-8100.*

November 18-20. AMA Packaging Clinic, The Packaging Engineer—What Are His Responsibilities?, New York. Contact: John A. Warren, American Management Association, 1515 Broadway, New York 36, New York. *Telephone: Judson 6-8100.*

December 2-4. AMA Packaging Clinic, How to Prepare Packaging Specifications, New York. Contact: John A. Warren, American Management Association, 1515 Broadway, New York 36, New York. *Telephone: Judson 6-8100.*

December 16-18. AMA Packaging Clinic, Packaging Operation of Small Runs and Multiple Items, New York. Contact: John A. Warren, American Management Association, 1515 Broadway, New York 36, New York. *Telephone: Judson 6-8100.*

January 6-8. AMA Packaging Conference (special packaging conference), Commodore Hotel, New York. Contact: John A. Warren, American Management Association, 1515 Broadway, New York 36, New York. *Telephone: Judson 6-8100.*

January 20-23. National Canners Association Convention, Traymore Hotel, Atlantic City. Contact: Nelson H. Budd, National Canners Association, 1133 20th Street, N. W., Washington 6, D. C. *Telephone: Executive 3-7030.*

January 19-23. Canning Machinery and Supplies Association Exhibit, Convention Hall, Atlantic City. Contact: W. D. Lewis, Secretary, Canning Machinery and Supplies Association, 4630 Montgomery Avenue, Washington 14, D. C. *Telephone: Oliver 6-6979.*

The executive and editorial offices of Package Engineering are now located at 185 North Wabash Avenue, Chicago 1, Illinois. Telephone FInancial 6-1440.

Articles

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A candid review of specific experiences, trials and errors, and problem solving encountered in developing an aerosol operation.

36 The human side of net weight control, by Ralph E. Yocom, plant manager, Consolidated Food Processors, Inc.
Showing that careful training and effective supervision of all levels of packaging personnel are necessary to insure maintenance of net weights.

44 Technique of nailing a wood crate, by L. O. Anderson, engineer, Forest Products Laboratory, U. S. Department of Agriculture
Having discussed wood box nailing in his previous article (June, 1957), Mr. Anderson now turns to the fine points of nailing a wood crate.

51 The role of linings in collapsible tubes, by Wayne E. Rathbun, plant manager, The Sheffield Tube Corporation
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56 How good is your fibreboard box specification?, by Allyn C. Beardsell, President, Container Laboratories, Inc.
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64 Use of specifications aids package control
Some facsimile reproductions of corrugated box specifications that may help others who are seeking to crystallize their own specifications.

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Our December 1957 issue will carry a cumulative editorial index for the year listing our feature articles by subject, author, and other headings.

"Simulated Frame Vue" by
Morris Paper Mills Division, Chicago,
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A note from the Publisher

During the last two years, many hours have been spent answering letters from readers who are looking for a particular piece of packaging equipment or the answer to a packaging problem. Some of the problems are extremely easy to answer, but quite a few of them involve considerable 'phoning and letter writing to come up with the right answer. Like most problems that seem difficult to solve at the outset, these too, are ridiculously simple when the answer is found. It's usually just a matter of locating the proper manufacturer.

For instance, a textile manufacturer wrote to us some months ago asking if we knew of equipment which would mechanically wrap bolts of cloth. After talking to, and writing to, at least half a dozen manufacturers of packaging machinery, one said he thought the equipment used to wrap tires would do the job and suggested asking a tire company how they accomplished this. A letter to one of our readers, a chief packaging engineer at one of the rubber companies in Akron, brought forth the name of a company in Chicago which manufactured equipment that would do exactly what the textile man wanted . . . certainly a simple solution when the answer was found, but it took a lot of searching to come up with the answer.

After doing this for two years, it has become increasingly apparent that a centrally located library on packaging would be helpful to the industry as a whole, and also would enable us to answer your questions faster and more easily.

Until September 1, when we moved into our new offices, we just didn't have the space to set up such a library. However, in laying out our new offices we set aside space for a reference library on packaging, and we hope you will use it — either by coming in or by writing to us for information you need. We are not set up so that we can write a doctor's thesis on request, but we will do our utmost to answer your questions adequately. You, of course, are welcome to spend as much time as you want with the material we have assembled.

We have just about every packaging magazine that is published — American, Canadian, and British, as well as several foreign language packaging magazines. We have most of the standard reference books on packaging, as well as Packaging Institute reports, TAPPI specifications which refer to packaging, and various European packaging associations have sent us material they have compiled.

During the past two years we have received literally hundreds of pieces of literature describing various pieces of packaging equipment, types of packaging, and packaging materials that we have carried in our industry literature section. We have a good many brochures issued by suppliers giving performance data on the various packaging materials. These are all on file.

Now we are in the process of indexing and arranging the mass of information we have assembled so that it will be easy to locate material. In fact, I have increased my knowledge of libraries considerably just from asking the advice of experts about the best way to arrange and handle this material. We hope you will find it helpful.

Angus J. Ray
Publisher

PACKAGE engineering®

AN ANGUS J. RAY PUBLICATION

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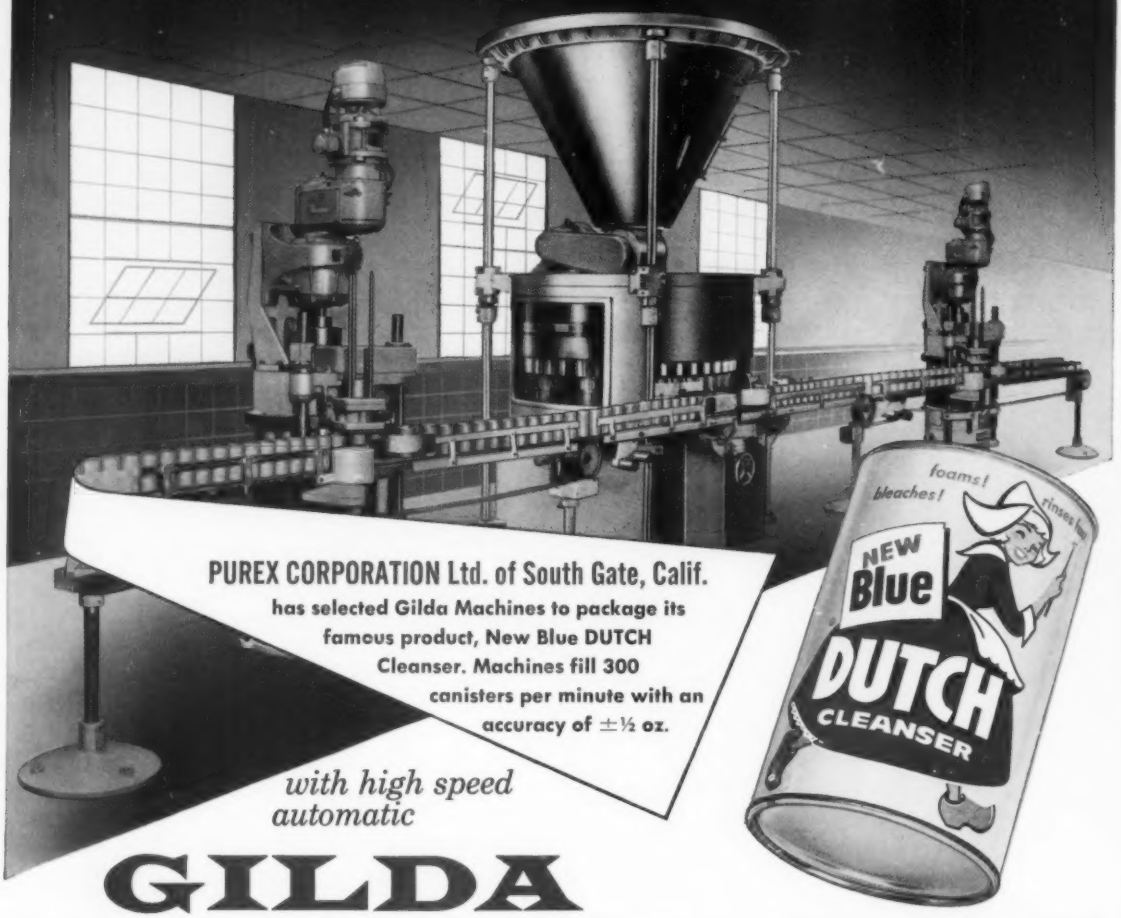

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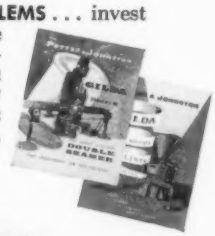
MORE DEPENDABLE . . . cost far less to operate and maintain.

MORE VERSATILE . . . filler handles any powder, granular or dry material; fills metal or fiber cans 5½" to 7¾" in height. Seamer puts tops or bottoms on cans 3" to 8" in height. Both machines change from one can height to another IN MINUTES!

END YOUR PACKAGING PROBLEMS . . . invest in an installation that will insure faster, lower-cost, more dependable seaming and filling than you ever thought possible. Send now for descriptive folders. Potter & Johnston Company, Pawtucket, Rhode Island.



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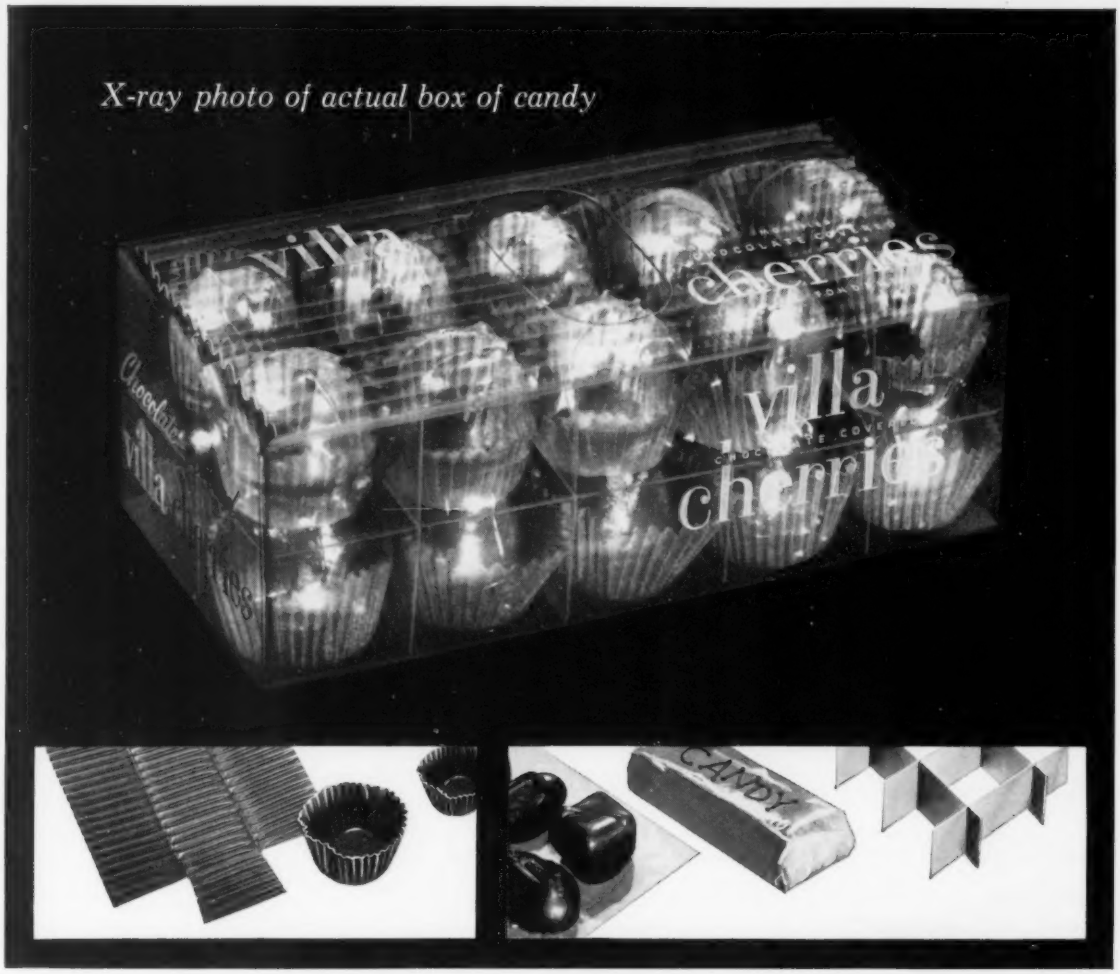

GLASSINE PAPER

The inside story on Protective Candy Packaging

Chocolate presents a tricky inside packaging problem. It has a high fat content which will stain and seep through ordinary papers. This will not occur, however, when layer pads, cups, and dividers are made of glassine. The inherent density of this Rhinelander paper is the reason.

Many candy bar wraps are made of Rhinelander glassine. Its glossy, rich appearance and smooth surface provide for excellent printing. Handles easily and economically on automatic packaging equipment. For added eye appeal, glassine is available in a wide variety of colors and in embossed, opaque, and translucent grades. Versatile glassine paper can fit your specific protective packaging requirement economically. Write for samples, stating application.

RHINELANDER PAPER

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Lucas Street & Ortho Way · Richmond, California
August 2, 1957

King Sales and Engineering Company
441 Folsom Street
San Francisco 5, California

Gentlemen:

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We tried out other machines, which were excellent, but had some weaknesses which caused them to be unsatisfactory in overall performance by comparison. We have stuck to the King because they contribute to an economy in standardization, and they are efficient and reliable.

We use your Gluers for a variety of operations. The principal use is for gumming bag labels. They are also used for labeling certain carton cases, and for drums.

Very truly yours,

TRUE PORTABILITY
POSITIVE CONTROL
EASIEST CLEANING

ECONOMICAL
VERSATILE
EFFICIENT

Best for all manual labeling — shipping — mailing

See your King dealer.
Write for details.

King SALES AND ENGINEERING CO.
441 FOLSOM STREET SAN FRANCISCO 5

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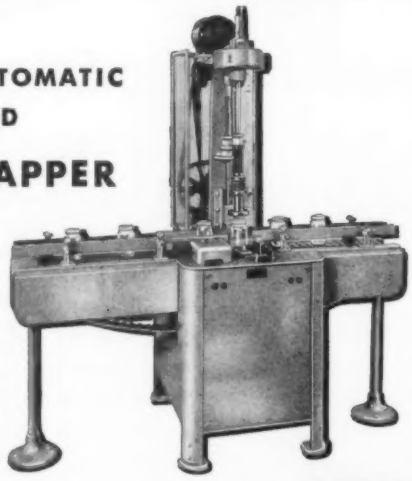
Elgin EARNS ITS WAY AUTOMATIC FEED

Semi-Automatic CAPPER



Whatever your packing needs, large or small, the Elgin AutomaticFeed Semi-AutomaticCapper delivers rapid, trouble-free capping with a broad range of lug and screw caps! After the operator starts the caps, an automatic timing device takes over—allowing only one container to pass into the capping station at a time. Two jaws—one stationary, one movable—hold the container while a revolving spindle lowers to tighten the cap to any desired tension. Change-over time is quick . . . just set spindle height, change chuck ring and reset timing box. The Elgin Capper handles all sizes and shapes of containers.

Write for complete literature
Address Dept. E-711

PACKAGING MACHINERY MANUFACTURERS INSTITUTE PMMI MEMBER

ELGIN MANUFACTURING COMPANY
200 Brook Street, Elgin, Illinois

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Letters to PACKAGE engineering

Gentlemen:

Recently, I have been assigned the job of attempting to standardize, and to make a study of possible cost reduction in our field of packaging.

At the present time, our method of securing a carton for a new or re-designed item, is to furnish several of these items to various carton companies and for the purpose of obtaining sample cartons; make our own test shipments; compare results; and then make a choice of the various cartons tested.

I am writing you for a suggestion of some books or articles I could read, pertaining to establishing a packaging department that could recommend changes; reduce costs; and have a bit more control over our entire packaging set-up.

S. G. Lucas
Research Laboratory
Universal-Rundle Corporation
Mahoningtown, Pa.

We are sending you a copy of "How to set up a package development department," by H. Earl Nack, packaging consultant, North Hills, Pennsylvania. This article appeared in our April 1957 issue. Mr. Nack was associated with Merck, Sharp, and Dohme for 42 years and was manager of its package development and specifications department for 20 years prior to his recent retirement. We also commend to you the article, "Determination of packaging costs," by Robert D. Courtright, International Business Machines Corporation, Poughkeepsie, New York, appearing on page 57 of our October 1957 issue.

Gentlemen:

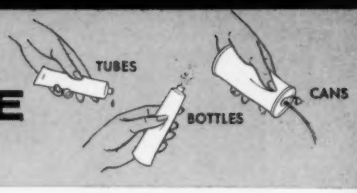
I would appreciate receipt of the following:

a) Any samples of good specifications for corrugated cartons that you may have.

For more information circle No. 209 on Card

NO. 3 OF A SERIES

Bracon ▸ SQUEEZE-TO-USE PACKAGING



How to prepare artwork for Bracon polyethylene tubes . . . bottles . . . cans

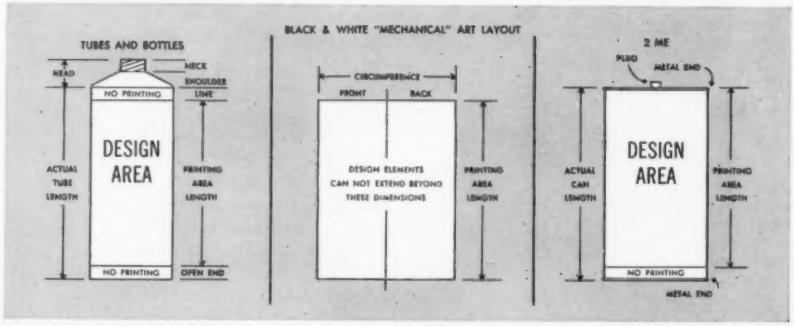
There are many questions which arise when manufacturers decide to print polyethylene containers.

Let's say your management has decided to provide its product with the many advantages of squeeze-to-use packaging. *First*, your production people would work with Bradley technicians to *evaluate the product for polyethylene packaging. Next*, you'd consider *filling and sealing* problems. *Now* let's look at possible approaches which *will provide attractive designs for the container's exterior.* BRACON technicians have established procedures for handling your artwork and adapting it to polyethylene printing requirements. Five alternative methods are described below:

1. Send rough tissue layouts of your proposed design. BRACON will prepare design mock ups for your approval. Upon approval of mock ups, BRACON will prepare the black and white artwork — sending photo prints and color samples to you for final okay before ordering plates.
2. Have your designer get in touch with BRACON. BRACON will cooperate in furnishing information, design assistance, samples, printing specs, or assist in development of designs in coordination with your designers.
3. Send rough tissue layouts to BRACON. BRACON will check your design for compatability with the BRACON process and send back the layout with their recommendations for customer preparation of finished art.
4. Send labels, art, previous containers or packages. BRACON will prepare original designs, sending back suggestions either in rough layout or mock up form for approval. BRACON will prepare final artwork after receiving approval of designs and will send photo prints and color samples before ordering plates.
5. Send information, ideas or thoughts, etc. to BRACON. BRACON will prepare original art, merchandising ideas, and layouts in mock up form. Your Art Department or outside design source can develop the finished black and white art following BRACON layouts and BRACON specification sheets.

Whatever alternative is used, you have the option of receiving artwork from BRACON in any of these forms:

1. Rough layouts in mock up form
2. Rough layouts in two dimensions
3. Comprehensive layouts in mock up form
4. Positive acetate prints of final artwork in mock up form
5. Print samples



Printing Surface: The area which is available for printing on a container must be carefully defined to the art group who will be responsible for final drawings. Of course, it is important to the designer, also, to know the limitations of ink coverage imposed by manufacturing methods. The drawings above show how the "printing area" is determined for both tubes and bottles, as well as squeeze-cans.

Certain precautions should be observed before submitting final artwork for BRACON processing. The following rules will provide a general rule-of-thumb for evaluating your printing.

Proceed with caution . . . check with Bradley *first* if you want to:

- Use duo-tone or full process screen.
- Employ large solid print areas covering more than one-half of tube surface.
- Design large reverse in the same color as small type. (Heavy ink coverage necessary for reverse areas will cause small type to fill in and blot.)
- Use fine detail or strippling, dry brush, etc.

There's no problem if you:

- Keep detail open and reasonably coarse when illustrating in pebble and scratch board.
- Observe caution in designing 85 to 100 line halftone and Benday reproductions. Halftones cannot be run on plastic heavier than 85% of color density, and the process requires special handling which is not possible in all cases.
- Provide 1/32" minimum clearance for cross hatched panels or decorative borders.

Hints on Registration

- Avoid overprinting of colors.
- Provide panel for small type when complete circumferential reverse area is used.
- Restrict two-color registration to one side, and if possible, provide 1/32" min. clearance between colors.
- Use caution in designing circumferential bands.

Type Tips

- San serif styles reproduce best for body and small point size copy.
- News Gothic Condensed and Futura Medium Condensed have proven most successful for extensive body copy, and can be reproduced as low as 3 point.
- For reverse copy, Heavy San Serifs are best.
- Bodoni — Caslon and Century Regular reproduce poorly.
- If traditional type style is desired, Century Schoolbook has been found to reproduce well.
- Smallest positive type size — 4 pt.
- Smallest negative type size — 6 pt.

BRADLEY CONTAINER CORPORATION

A subsidiary of American Can Company

MAYNARD, MASSACHUSETTS

New York • Chicago • Los Angeles • Toronto

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WHEREVER SOMETHING
STICKS
Modern Packaging Engineers Use
IMS
SILICONE
FLUID SPRAY ?

WHEREVER ANYTHING STICKS TO METAL SURFACES—ON FILM SEALERS, CRIMPER JAWS, EMBOSSING ROLLS, PANS, STAMPING, FORMING DIES—MOLDS OF ALL KINDS

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Per Unbroken Dozen..... $18.00
Per Unbroken Gross..... $197.40

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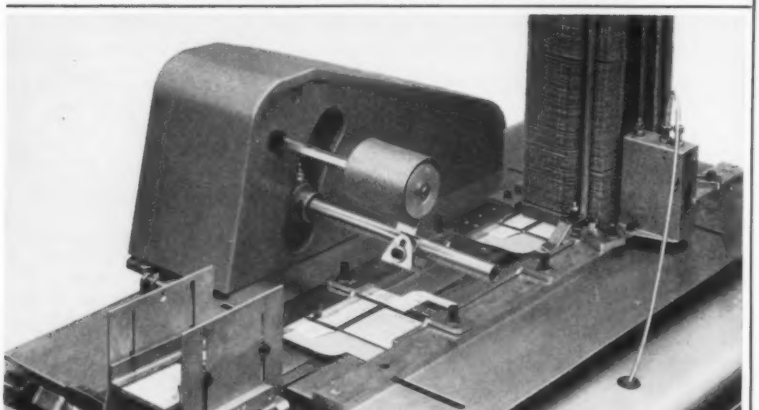

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THE STANDARD OF QUALITY IN CARTON SET-UP

Print and Set-up in one operation. Another innovation from BIVANS, the quality name in cartoning equipment.

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2431 DALLAS STREET, LOS ANGELES 31, CALIFORNIA
Dist. By New Jersey Machine Corp., Hoboken, Cincinnati, Chicago, Los Angeles

Letters to Package Engineering

(Continued from Page 8)

b) Information concerning the most economical procedure for the inspection of incoming cartons which are received in lots of from 500 to 2500.

Allen J. Howe
Methods Engineer
Duro-Test Corporation
North Bergen, New Jersey

We direct your attention to Mr. Beardsell's article appearing elsewhere in this issue. We also direct your attention to a facsimile of a package specification of Farnsworth Electronics Company appearing in this issue. We are sending you a reprint of "Quality control — when, where, and how," by Paul K. Leatherman, which appeared in our October 1956 issue. His basic observations will help orient your thinking in regard to establishing procedures for the inspection of incoming packaging materials.

Gentlemen:

I believe that I know the able group at Signode well enough so that I may write you my thoughts and comments relative to Frank Kautter's well written article, describing Signode's program in shipping its coils.

We commend the person who realizes that drop tests are the best method of determining what you have in packaging. We say this because it involves a figure of measurement that applies to dynamic shock rather than the incorrect static unit, the "g".

We are greatly concerned, however, in the standards used because they are, in most instances, arbitrary and so many packaging engineers have permitted themselves to follow arbitrary standards.

For drop heights why not determine with recorders the drop heights to use. Mr. Ray commented several months ago in Package Engineering that test shipments without instrumentation do not lead to definite conclusions. Maybe the 6" drop is too high or too low. The same thinking

For more information circle No. 211 on Reader Service Card

Vulcan delivers steel pails *faster,* SAVES YOU SPACE AND MONEY!

This is a true case history of all the companies who use Vulcan steel shipping containers. Their composite story reads like this: delivery of pails forced them to tie-up excessive funds and space in a big inventory. They switched to Vulcan, and got faster delivery, in all quantities, on a precise and rigidly maintained schedule. Their inventory needs dwindled rapidly, and they had more free cash and manufacturing space. The same thing can happen to you, because Vulcan is an expert authority engaged exclusively ih the manufacture of steel pails and drums, and maintains the largest warehouse stock of these items. This means we can deliver your needs and inventory savings at the same time. May we prove it to you?

NOW! REDUCE STEEL CONTAINER INVENTORY COSTS! MAIL THE COUPON TODAY FOR TEST SAMPLES AND THE NAME OF YOUR VULCAN REPRESENTATIVE!

Hi-Bake protective linings · one to 55 gallon capacities all variations of open or closed heads faster delivery from the largest warehouse stock · from a carton to a carload · brand name decoration · special designs

VULCAN
CONTAINERS INC.
Bellwood, Illinois

VULCAN CONTAINERS INC., Bellwood, Illinois

Gentlemen: I am interested in:

☐ Pails, in the following sizes.....

☐ Hi-Bake protective linings for (product).....

☐ 55 gallon drums.

Please get this information to—

Name.....

Company.....

Address.....

City..... Zone.... State.....

Labeling Lines

by George L. N. Meyer, Jr.

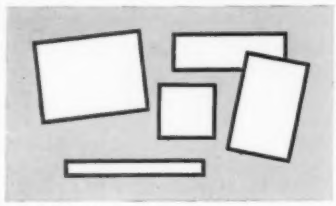
FOIL LABELS . . . AND THEIR APPLICATION

Foil labels are becoming increasingly popular and are used by many manufacturers for Beverage, Food, Cosmetic and Drug products. To aid the bottler with foil label requirements we'd like to pass along a few thoughts . . . hints which have been garnered both from bottlers and our own experience in the field of labeling machinery.

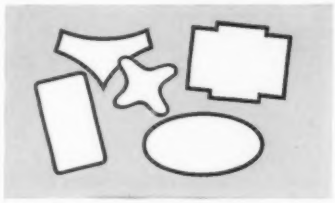
First of all, foil labels should only be applied to uniform glass. These labels easily follow any contour and it should be remembered that their close adhesion makes defects in the glass much more apparent. Secondly, a good grade of paper-backed foil measuring .0025" to .0030" should be used. Where a returnable bottle is used, the paper backing must have proper characteristics not only for application but also for removal.

All paper is susceptible to moisture pick-up and when laminated to an impervious material such as foil, this susceptibility can result in distortion unless the moisture content is closely controlled. Simply – the paper fibres swell and expand while the foil retains its shape – result – a curled label. The dimensional change is always the same . . . *across* the grain of the paper fibre. Little, if any, change occurs in the opposite direction.

Realistically, it is virtually impossible to control the effects of humidity on the labels from the time of manufacture until they arrive at your receiving platform. *Then* you can take *definite* steps to minimize the factors which cause label curling. A step in this direction takes place with a die-cut label. Die cutting work-hardens the label edge slightly, thus increasing the edge strength and reducing the net curling tendency of the lamination. Conversely, straight cut labels (Guillotine) are more apt to curl than die-cut labels. Neck foil stock usually curls less than straight cut or large



Guillotine Cut



Die Cut

die-cut labels since it is a very light material and, more often than not, is embossed. Embossing breaks the paper fibres and thus inhibits curling.

Label storage should be in locations where the relative humidity does not change radically (areas open to circulation of air during warm weather to prevent the possibility of condensation). Cold weather storage of labels should be in areas where the effects of artificial heat are not too great; a warehouse with a temperature of 50-55°F would be preferable to a room maintained at 80°F. At the end of a day's run, the labels in the labeling machine should be removed and wrapped (not tied or banded) and placed in a dry area to prevent excessive curling, particularly during the summer months.

Watch for "LABELING LINES." Future articles will contain helpful hints gathered from almost 60 years experience in the design, manufacture and sale of labeling machinery.

World's Largest Manufacturer of high-speed Labeling Machinery

WORLD LABELERS

ECONOMIC MACHINERY COMPANY • Worcester 3, Mass. / Div. of Geo. J. Meyer Manufacturing Co.

Letters to Package Engineering

(Continued from Page 10)

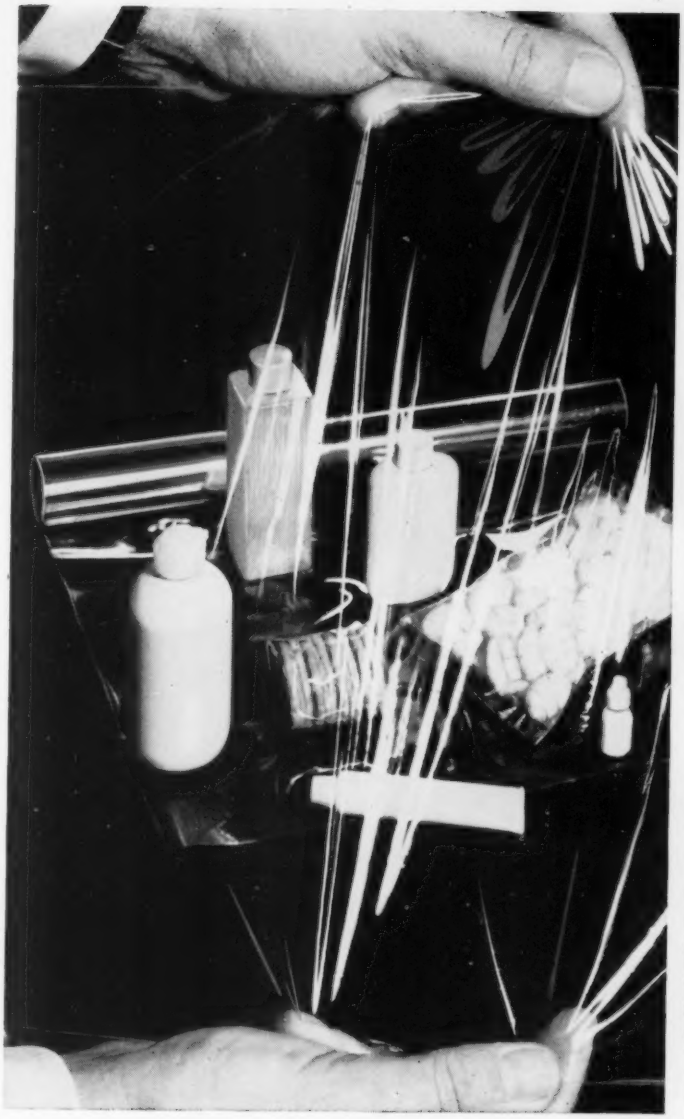
should apply to vibration tests. The arbitrary rule says 1 "g", but is that the average that the package receives in transit? Recorders can tell one just what the situation is.

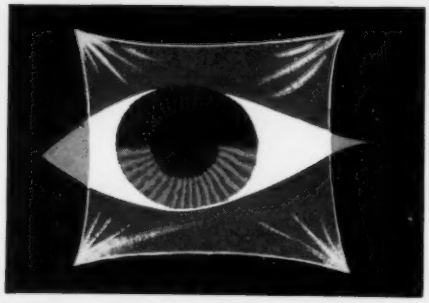
Mr. Kautter's modification of the Conbur is good common sense, but think of the many people who never gave this a thought. Wouldn't you say that a properly engineered package can only be proper if all the history and facts necessary to show what it will normally be subjected to are known and used in the engineering?

Placing a recorder on a package in a freight car that was bumped and comparing its readings with that of a recorder attached to the floor or wall of the car that the package rode in will reveal a substantial difference in readings. When a car is coupled it actually jumps. In simulating or trying to simulate car handling are other forces ever considered on Conbur testing?

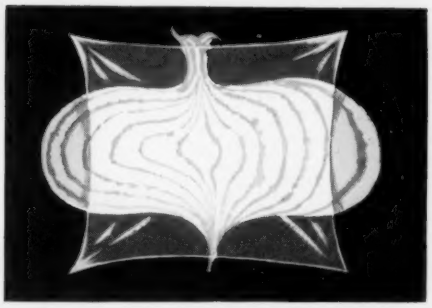
Willard S. Mielziner
Impact-O-Graph Corporation
Cleveland

We are glad to see more and more aroused interest in realistic package testing. Regardless of the means of instrumentation used, any step taken to reduce a general or vague factor to a quantitative measurement deserves the attention of those charged with the package engineering function. At the same time we should like to stress the importance of practical and meaningful tests, i.e., specifically suited to the type and condition of package testing involved in a particular case. Further, testing must be supplemented by field tests, actual shipping tests — all calculated to show what actually happens to a package rather than merely what is likely to happen to it.

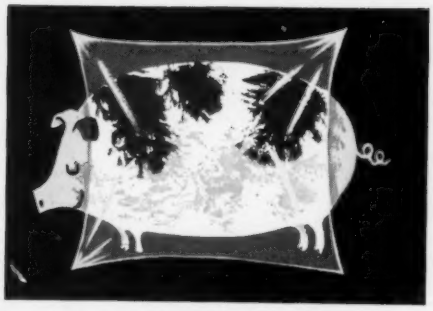




Improved clarity



Reduced gas permeability



Improved resistance to oils, grease, chemicals

Dramatic improvement for polyethylene packaging with saran resins

Saran is the synonym for protective packaging! And saran resins will coat your polyethylene materials with this added protection . . . and save you time and money in the coating operation.

A thin coating of saran resins reduces gas permeability and improves clarity. It adds outstanding resistance to oils, greases, acids and many organic liquids and vapors. It helps polyethylene meet the needs of a wide variety of new applications.

But there's more to coating with saran resins coating than product benefits. They are adaptable to commonly used equipment. A new saran resin is soluble in acetone, releasing solvent at lower temperature. Drying requirements are lowered . . . coating cycle is speeded up . . . costs are less.

For other packaging films, for paper, too . . . it will pay you to get the technical data on saran resins from Dow. Write today to THE DOW CHEMICAL COMPANY, Midland, Michigan, Plastics Sales Department 1879H.

YOU CAN DEPEND ON DOW

Why——

HORIX GRAVITY AND GRAVITY-VACUUM FILLERS ARE *First Choice* IN THESE INDUSTRIES

CATSUP, CHILI-SAUCE

- Gravity fill
- No aeration
- Minimum Maintenance
- Absolute accuracy of fill
- Individual container control
- Speeds up to 700 cpm.

WHISKEY, WINE

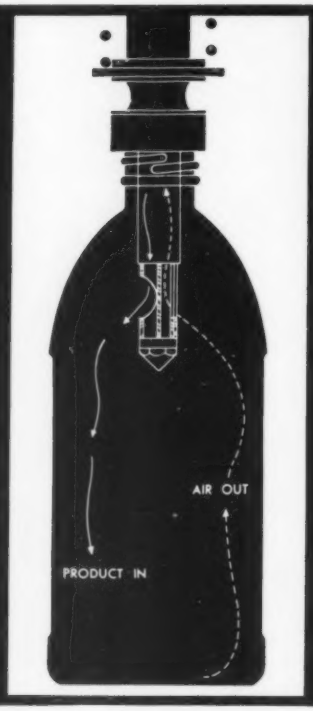
- Finest quality control
- Gravity-vacuum fill
- No overflow return system
- No loss of proof or bouquet
- No oxidization
- Speeds up to 200 Fifths per min.

JUICES

- Gravity Fill
- Cans or glass bottles
- No aeration
- Foam Controlled
- Minimum Maintenance
- Accuracy of Fill
- Speeds up to 700 No. 202 cpm.

WAX, HOUSEHOLD PRODUCTS

- Directed flow
- Foam controlled • Accurate Fill
- No container distortion
- Speeds up to 65 gal. per min. 324 pts. per min.



BASIC HORIX METHOD OF LIQUID FILLING is illustrated by flow diagram above. The principle is the same whether filling bottles or cans . . . the product flows smoothly, gently, by gravity* from the supply tank through the valve into the container resulting in highest operating efficiency and finest quality control.

*In Horix gravity-vacuum fillers, fill takes place by gravity within a low-vacuum system established in the tank and container. Vacuum does not pull the product into the container.

PETROLEUM PRODUCTS

- "F" style cans or sanitary cans
- Same filler for oil & anti-freeze
- Valve seals dented cans
- No splash—no product loss
- Speeds up to 150 san. gal. anti-freeze per min.

SYRUPS

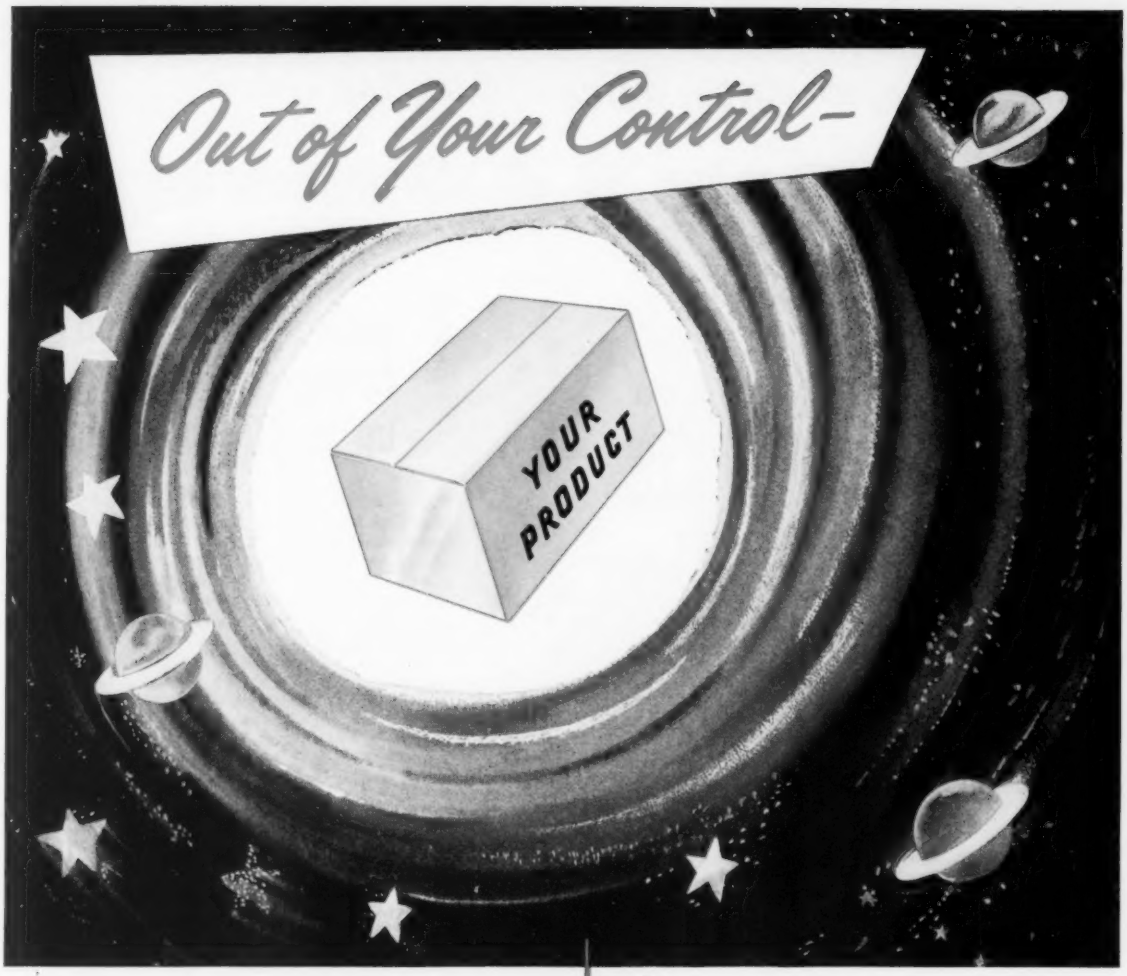
- Jugs or sanitary cans
- Gravity or Gravity-Vacuum
- No overflow system
- Foam controlled
- Special valve eliminates foam on top of sanitary can
- Speeds up to 65 gal. jugs per min.

PHARMACEUTICALS, ACIDS

- No overflow return system
- Acid proof valves. Special metals on request (Aluminum, Hastelloy or Plastic)
- No collapsing of plastic containers (including thin wall)
- Semi-Automatic or Fully Automatic

FULL RANGE OF MACHINE SIZES • 6 TO 48 VALVES • ALL CONTAINERS

HORIX
MANUFACTURING CO. · PITTSBURGH 4, PA.
FILLERS AND CONVEYORS



. . . but SAFE in an Inland container!

● As your product goes out the shipping room door, you lose all direct control over its condition. The shipping container becomes its sole defender against the many hazards it must endure until it reaches its destination. An Inland container, carefully engineered and made of quality materials will deliver your product in the condition your customers expect to receive it. That's why we say "Inland Boxes Build Good Will."

If we're not already serving you, call or write today. An experienced Inland Package Engineer is always at your service.

INLAND CONTAINER CORPORATION

INDIANAPOLIS 6, INDIANA

Corrugated Fiber Boxes

MILLS: Macon, Georgia; Rome, Georgia.

PLANTS AND SALES OFFICES: Indianapolis, Indiana; Middletown, Ohio; Milwaukee, Wisconsin; Evansville, Indiana; Detroit, Michigan; Macon, Georgia; Erie, Pennsylvania; Ashtabula, Ohio; Orlando, Florida; Rome, Georgia; Biglerville, Pennsylvania; Dallas, Texas.

OTHER SALES OFFICES IN PRINCIPAL CITIES

A significant advance in automatic high-speed carton filling and sealing

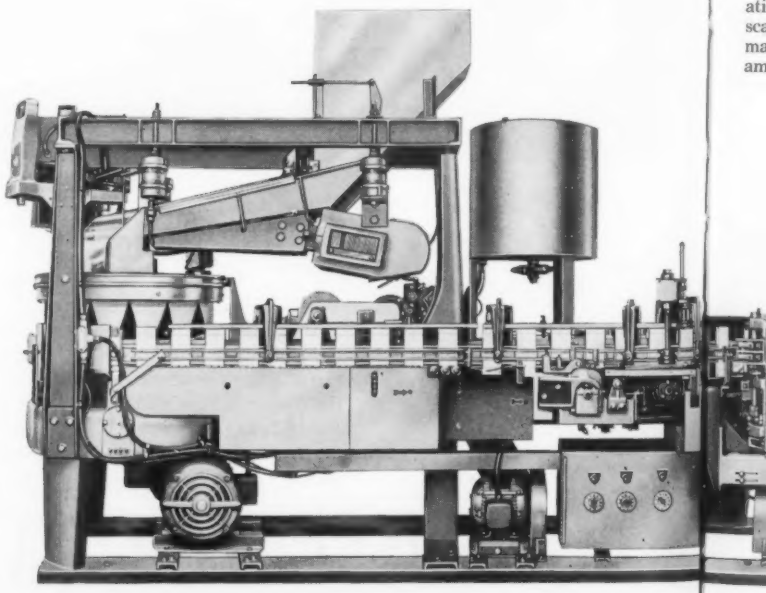
Only S & S Neverstop c

Typical preprinted folding cartons automatically filled and sealed, with hot-melt adhesive, on Neverstop Model EH operating at a speed of 400 cartons per minute.

1 High speed carton filling and sealing... up to 400 per minute

Stokes & Smith has perfected and incorporated as standard features a series of important refinements which make possible higher filling and sealing speeds than ever before. First of these refinements is a new method of carton feeding utilizing suction to open and accurately position the cartons in the feed conveyor. Depending on the carton size, this new feed can operate at a rate up to 400 cartons per minute.

Selective, continuously running glue rolls, accurately spot adhesive on the carton flaps to assure positive bonding at high speed. To accurately control net fill at these high speeds Stokes & Smith has devised an entirely new electronic filling head to maintain the 400 per minute rate offered by the other refinements.



For complete details of these new developments, write for your copy of Neverstop Bulletin P-808.

fmc
FOOD MACHINERY AND CHEMICAL CORPORATION

FMC PACKAGING MACHINERY DIVISION

Stokes and Smith Company

4994 SUMMERDALE AVE.
PHILADELPHIA 24, PA.

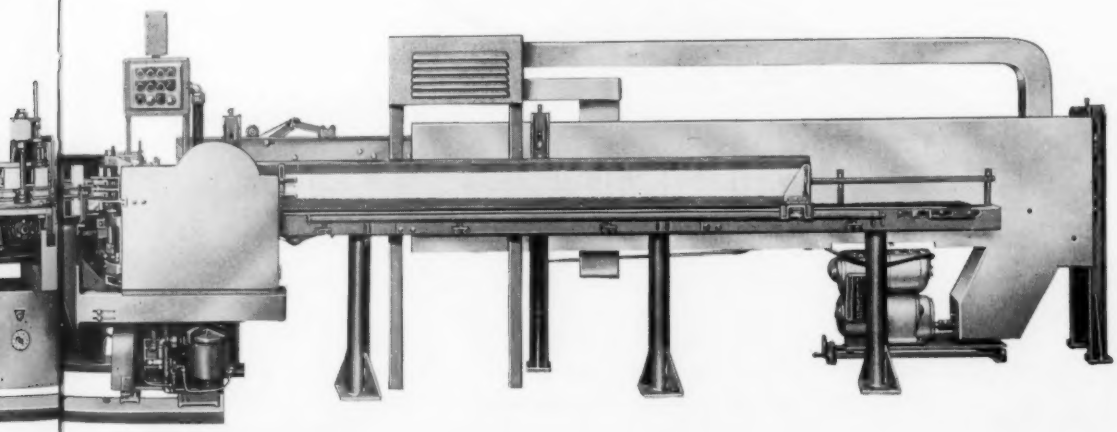
...can give you...

2 Electronically controlled filling accuracy

This radically different filling method is designed for high speed filling which is accurate even when product density varies. The new head controls by electronic feed-back the rate of product flow into cartons to assure uniform net weight fill. It consists of a vibrating chute from which the product is continuously discharged on to a slanted check-weight scale pan and then into the cartons. The rate of flow is pre-set to deliver required net fill at the desired speed. Any deviation from this pre-set rate of flow is detected by the scale and relayed to the electronic monitor which automatically corrects the rate of flow by adjusting the amplitude of vibration in the chute.

3 With either hot melt or cold glue

For the first time, two basically different types of sealing are offered to assure positive bonding of a wide variety of carton stocks. In addition to cold glue, Stokes & Smith now offers models equipped for hot melt (thermoplastic) adhesive sealing . . . perfected and field tested for Neverstop in cooperation with adhesive producers and carton suppliers. With suitable cartons, hot melt opens up excellent possibilities for producing carton seals made sift-tight and "moisture-proof" without liners or overwraps. Substantial savings can thus be realized in the packaging of cereals, soap powders, spices, dessert powders and many other free flowing products where such sealing properties are desired.



6 models

To meet your packaging requirements at lowest cost, Neverstop is available in six models with a wide range of options as to carton size, speed of fill, filling method and type of adhesive.

Dow Corning

SILICONE COATING

ON PAPER AND PAPERBOARD KEEPS YOUR PRODUCTS FROM STICKING TO BAGS, BOXES, AND WRAPS.

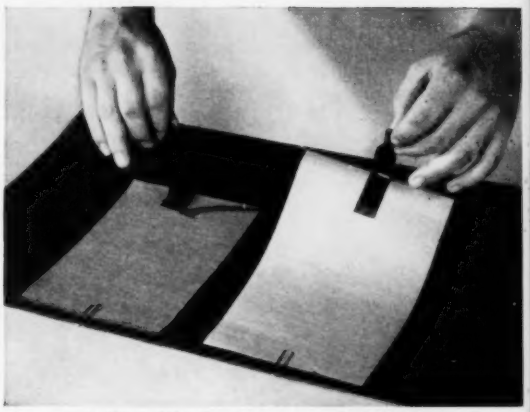
New "EASY OUT" FOR A

Anyone packaging sticky products in paper or paperboard containers can now offer their customers easier "release" with a Dow Corning SILICONE COATING. This new paper coating provides a surface to which almost nothing will stick. The gummiest of materials . . . asphalt, raw rubber, candy, glue, gums, virtually any adhesive mass . . . can be easily emptied from silicone coated packages.

This means you can give your customers a major benefit at little or no extra cost to you . . . they get all the product out of each package . . . quickly, cleanly, effortlessly.

SILICONE COATING is easily applied at the mill or by the converter to any packaging stock—from glassine to boxboard. Bags, boxes, cartons, wrappers, interleaving sheets . . . all can be supplied with the new Dow Corning anti-adhesive SILICONE COATING.

1. Both samples shown are of the same paper. Piece at left has the new SILICONE COATING. Other sample is untreated. Pressure-sensitive tape is pressed firmly on each.



2. When lifted, the tape applied to silicone coated paper flicks free without clinging. Tape applied to untreated paper sticks tight. Make your own test.

R ALL STICKY PRODUCTS

Silicones Don't Contaminate — Industrial products, such as rubber and asphalt, are not contaminated in the least by the new SILICONE COATING. Nor are consumer goods, such as candy and sweet rolls, affected by the "food grade" coating specified for food packaging or wrapping.

No Undesirable Effect on Paper . . . Dow Corning's new SILICONE COATING is colorless, odorless, and in no way alters the body or physical strength of paper or paperboard.

Coating Doesn't Migrate— SILICONE COATING remains on the surface to which it's applied . . . won't transfer through to the other surface, or to the product, even under heat and pressure.

Costs No More — For most applications, the cost of a Dow Corning SILICONE COATING is comparable to conventional non-adhesive coatings. And, because SILICONE COATING adds such little weight, freight costs are less than those for conventionally coated papers.

Permanent — The SILICONE COATING is there to stay and it doesn't come off or deteriorate. You can store silicone coated papers indefinitely . . . or even re-use them.

Water Repellent — The Dow Corning SILICONE COATING is inherently water-repellent and imparts this characteristic to any paper or board to which it's applied.

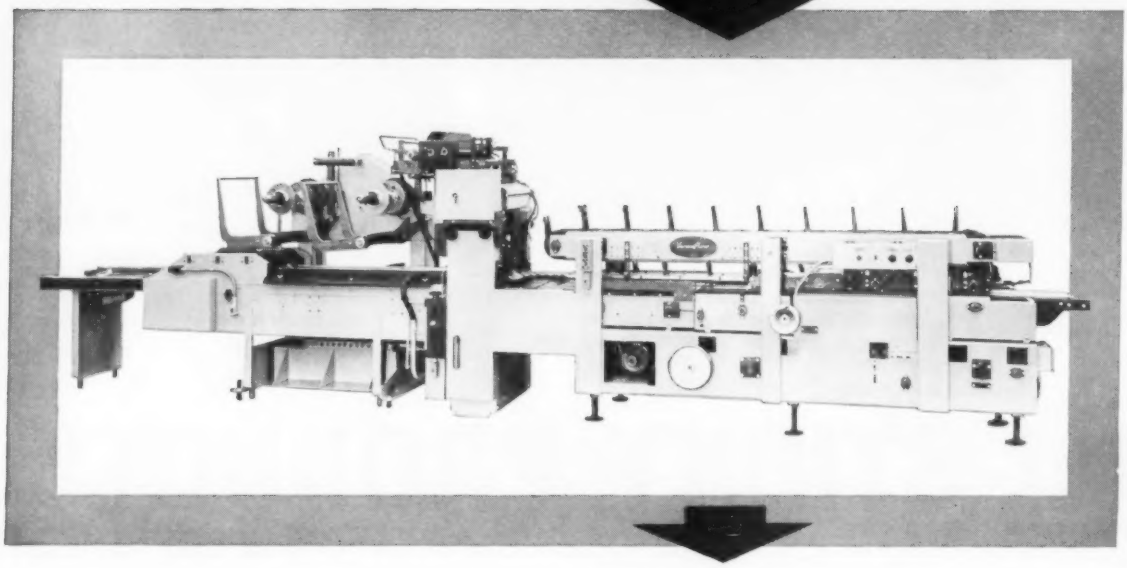
Free Samples ***For full information, samples of silicone coated papers, and a list of suppliers, WRITE DEPT. 5223a.***

first in silicones

Dow Corning CORPORATION
MIDLAND, MICHIGAN

ATLANTA BOSTON CHICAGO CLEVELAND DALLAS DETROIT LOS ANGELES NEW YORK WASHINGTON, D. C.
CANADA: DOW CORNING SILICONES LTD., TORONTO GREAT BRITAIN: MIDLAND SILICONES LTD., LONDON FRANCE: ST GOBAIN, PARIS

Only the new *Versaflow-150*



gives you straight-through packaging with no reciprocating motions

Here's another example of Package engineering leadership—the Versaflow-150. In the Versaflow, you will find an entirely new concept of handling over a wide size range. Packages move straight through the machine on a single level without changing direction. Continuous, uninterrupted speed, from infeed to discharge, assures gentle wrapping without upsetting package contents. There are *no* elevators, *no* reciprocating motions.

A special transfer feature on the Versaflow-150 enables you to feed directly from your production line. No direct drive hook-up is required. Belt infeed receives packages automatically, feeds them to the chain drive. Sealed ball bearings on all turning shafts eliminate maintenance, another Package 'plus' feature.

The Versaflow-150 will handle packages from 6" to 14" long, 3" to 7½" wide, 1" to 5" high. Variable speed drive permits operation up to 150 packages a minute. It wraps with cellophane, wax paper or heat-sealing foil. To get complete details, contact your nearest Package representative.

PACKAGE MACHINERY COMPANY

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A SWIFT'S ADHESIVE PLANT IS NEARBY

A typical modern Swift Adhesives manufacturing plant. This attractive, efficient plant is located in Atlanta, Ga.

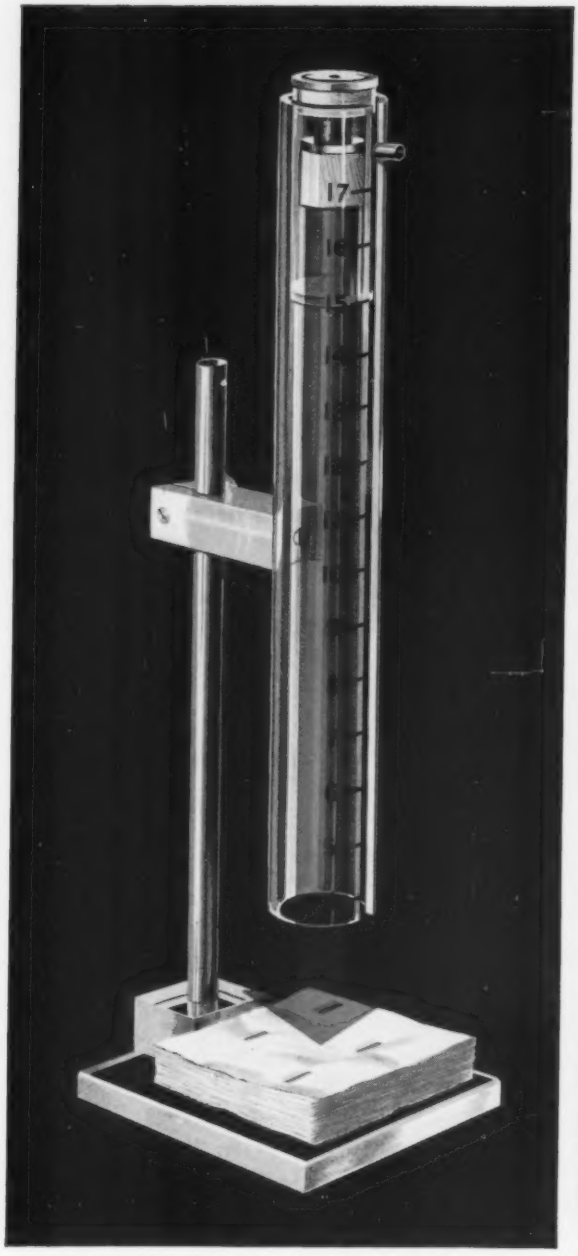
One of these twenty-one Swift Adhesive plants was located and established to provide you with a convenient, nearby source. Whether your requirements are large or small, the neighborly service you get from Swift complements Swift's high quality standards . . . makes Swift's Adhesives your best value.

For all your adhesives requirements, contact the Swift's Adhesive Plant nearest you. Their team of adhesives specialists is anxious to serve you. SWIFT & COMPANY, General Offices, Adhesive Products Department, Chicago 9, Ill.

Swift
102ND YEAR

To Serve Your Industry Better with these Adhesive Products

Resins and Rubbers in Emulsion or Solvent
Dry, Liquid and Flexible Animal Glues
Liquid Dextrin Adhesives



Kimpak can absorb the shock of a capsule dropped from a height of 15 inches without separation of the magnet and metal disk.

With another cushioning material of the same weight as Kimpak, 9.2 inches is highest capsule can be dropped without separating magnet and metal disk.

How test is made

For the "Shock Comparison Test" a small iron disk is held by a magnet. Both are contained within a transparent capsule. The capsule is dropped in a lucite tube onto a pad of cushioning material. The highest point from which the drop can be made without the magnet losing its hold on the metal disk is a direct measure of the shock absorbency of the cushioning material.

more shock absorption with

KIMPAK

INTERIOR PACKAGING

How much cushion protection can you expect from an interior packaging material? You can't tell too well from its apparent thickness. Most important is its *effective thickness*—or the *working thickness under load.*

The "Shock Comparison Test" was developed by the U. S. Forest Products Laboratory, Madison, Wisconsin, to compare the shock absorbency of cushioning materials under laboratory conditions. Pictured here is the instrument used in the test.

In the pictures of this test at left, the superior shock absorbing qualities of Kimpak are clearly demonstrated. The other cushioning material with *more apparent thickness* than Kimpak can absorb only about ⅔ as much shock.

This is because the specified thickness of Kimpak is all *effective thickness.* Kimpak is engineered to give you more working thickness than other cushioning materials of the same weight and cost . . . and consequently more shock absorption.

Kimpak in rolls or sheets cut to size is distributed in all major cities. Call your distributor or Kimberly-Clark for a packaging engineer to show this and other modern laboratory tests with Kimpak *right at your desk.* He will help you with your packaging problems, too.

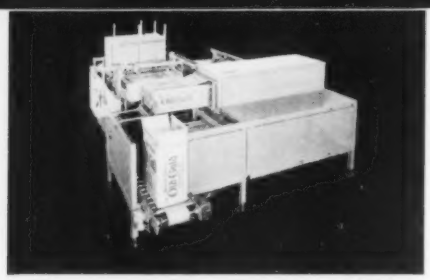
Measure the effective thickness of cushioning materials under the standard 3½ pound per square foot load prescribed by Federal Specification.

Kimberly-Clark offers this Standard Weight, precision made of sturdy aluminum, *free* to all packaging engineers and cushioning buyers. Just ask the Kimpak salesman who calls on you. Or write to Kimberly-Clark, Dept. E-11, Neenah, Wisconsin.

Kimberly-Clark
INTERIOR PACKAGING
KIMPAK

Kimpak is a trademark of
Kimberly-Clark Corporation, Neenah, Wisconsin

Does your case-packaging "date" you?



FEEDER-FORMER-POSITIONER-LOADER-UPENDER

This machine in operation at the P. Lorillard Co. automatically end-loads regular and kingsize cartons of Old Golds at the rate of 400 cartons per minute (60 cartons per case in a 2x5x6 pattern) or nearly 5 million smokes an hour. A high-speed machine which forms cases, positions and loads fully-automatically can be the answer to your packaging line. Write us for consultation or for additional information and prices.

J. L. FERGUSON CO. Joliet 1, Ill.

New York, Chicago, Cleveland, Boston, Tampa, Baltimore, Portland, Denver, Los Angeles, San Francisco, Seattle, New Orleans, Louisville, Kansas City and All Principal Canadian Cities.

PACKOMATIC machines include the Bale Sealer — Case Sealers — Opener-Loaders — Case Imprinters — Telescoping Volumetric Filler — Packer-Gluers. Units available, semi-automatic or fully-automatic depending on your needs.

Packomatic

T.M. Reg. U. S. Pat. Off.

equipment feeds, forms, positions, loads, seals, and imprints shipping containers automatically

From the time the magazine is stacked with "knocked-down" containers until they are loaded, sealed and imprinted, ready for shipment—not a human hand is required. Here's automatic, foolproof equipment Custom-Engineered to do the whole job—or any part of it for less—and at a speed to match any production line. End-loading techniques save up to 28% on paper board costs alone. Labor savings are obvious. And, Packomatic Custom-Engineered equipment can do the trick for virtually any product; witness the case loading patterns below. Whatever your requirements, whatever your budget, there's a Packomatic machine to cut costs and boost production in your plant.

Six 5-qt. cans or gallon cans in 20⅛" x 13⅛" x 9 3/16" case and 20¼" x 13¾" x 8¼" case

Twelve 46 oz. cans in 21" x 13" x 7⅛" case

Twenty-four cartons in 12½" x 10⅝" x 8½" case

Eighteen 7 & 8 oz. cartons in 20" x 14⅞" x 8⅝" case

Sixty cigarette cartons King Size: 17⅞" x 11½" x 22" Regular: 14 3/16" x 11½" x 22"

TYPICAL CASE LOADING PATTERNS FOR CANS AND CARTONS

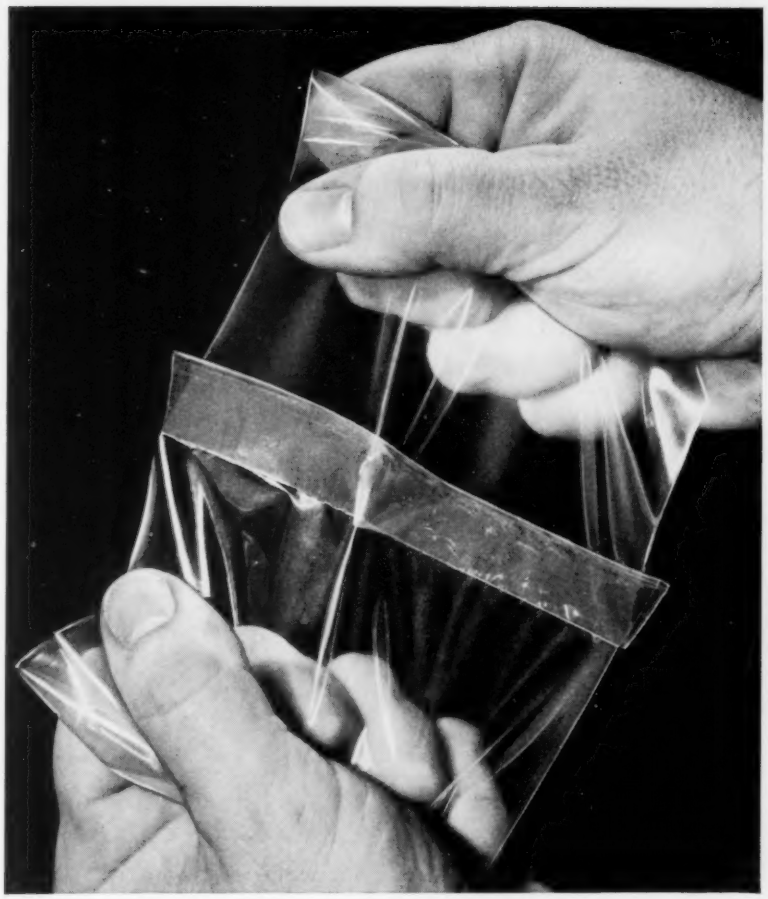
Twenty-four 12 oz. cans in 16⅜" x 10 5/16" x 5⅜" case

Six No. 10 cans in 22 1/16" x 17⅜" x 7⅛" case

Thirty 1 lb. cartons in 16⅛" x 10 9/16" x 7¼" case

Twenty-four cartons in 19½" x 10⅞" x 7" case

Forty-eight cartons in 22¾" x 23½" x 15⅞" case



Another first for 3M Research...

NOW...POLYESTER FILM YOU CAN HEAT SEAL!

Impossible? Not any more! "Scotchpak" Brand Polyester Film takes a seal as tough as the film itself—and easily: a temperature of 275° to 359°F. and 20-60 psi is all that's required.

"Scotchpak" is the perfect packaging material for critical applications where inertness of the wrapper and protection of the contents under extreme temperature conditions is vital. It resists most solvents and chemicals, has high moisture inertness and high tensile strength.

You can use "Scotchpak" for packaging such varied products as cosmetics, acids, syrups, silverware, oils, greases, adhesives, asphaltics, catsup and mustard, surgical dressings—and many others. It even makes an ideal container liner or insulation pillow.

For more information, send for the folder described at right.

TRADEMARK

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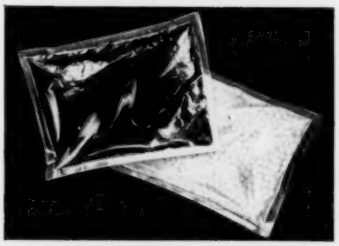

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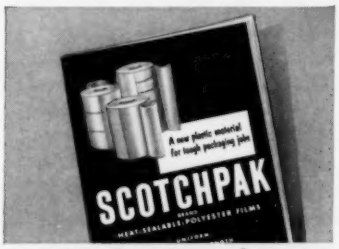

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Bernard H. Brusseau is a graduate of Middlebury College with a B.S. degree in chemistry. He also devoted one year to post-graduate work at Harvard. Prior to joining the Rawleigh organization, he was associated with Lever Brothers Co. engaged in laboratory work; with T. Noonan Sons Co. as manufacturing chemist; and with the perfume division of Rexall Drug Co. as assistant superintendent. He is a member of the Society of Cosmetic Chemists and the Society for the Advancement of Management.

DO'S AND DON'TS IN SETTING UP AN AEROSOL PACKAGING LINE

By BERNARD H. BRUSSEAU,
Production Control Director,
The W. T. Rawleigh Company,
Freeport, Illinois

Probably few executives *and technical specialists in the Rawleigh organization knew just what they were getting into when they launched their development and installation of an aerosol packaging line. With exceptional candor, Mr. Brusseau sets forth virtually a play-by-play description of the trials and tribulations of making such a line operative. His observations and experiences and those of his associates should prove of immeasurable value to others contemplating such a packaging line and should greatly enhance the growing body of aerosol packaging know-how and know-why.*

Have you ever undertaken to develop and install an aerosol packaging operation? Did your company have to start from scratch, as we did? We wonder how your experience compares to ours. While those presently engaged in aerosol loading might pick up an idea from this article, (and we sincerely hope so) the people whom we particularly have in mind are those contemplating entering this field. The reason for this is to provide them with as much preliminary information as possible. In this way, it is hoped that their road will be smoother than was the case with us in our own operation.

After management here decided that we would do our own loading, the next logical step was to gather all available pertinent data. This was considerably easier to say than to do. We contacted a great many people connected in some way with the aerosol field and, while many were genuinely desirous to help, we soon realized that there definitely existed a lack of good, solid information on the nature of equipment requirements and operating techniques.

We, therefore, concluded that we should have to learn the hard way. We don't claim to be experts, nor do we claim to have all the answers. But, we do have some — and we want to pass these along to future aerosol loaders so that they may profit from our experience.

Three-Part Operation

For purposes of discussion, we shall break down our aerosol department into three parts: namely, concentrate handling, propellent handling, and the filling line. That part which gave us the least trouble was the concentrate handling system. Since we package both household items and cosmetics, in reality we have two separate and distinct concentrate handling systems: one for household items (such as insecticides) and one for cosmetics. See Photos 1 and 1a and Fig. 1. Our combination manufacturing and storage tanks are located on the floor above the filling line.

The household system consists of two 500-gallon glass lined tanks each equipped with an explosion-proof motor-driven agitator. These tanks are charged from the floor above and each outlet is piped to a system consisting of a pump, pressure regulator, by-pass, and filter and then piped into the refrigerating unit.

The cosmetic handling system (see Photos 2 and 2a and Fig. 1) consists of the following: One 900-gallon stainless steel tank equipped with a variable speed explosion-proof motor driven agitator. This tank is also charged from the floor above. The pumping system here is somewhat different. Since some products foam (notably shaving cream concentrate) when handled, we selected an air-operated piston type pump having a 5-to-1 ratio.

Use Lower Pump Ratio

However, our experience has shown that this ratio is too high. We would suggest using a pump with either a 2-to-1 or a 3-to-1 ratio. This type of pump eliminates the need for a pressure regulator and by-pass system which would be impossible for a foaming product like shaving cream. From the pump (incidentally, all pipes are stainless

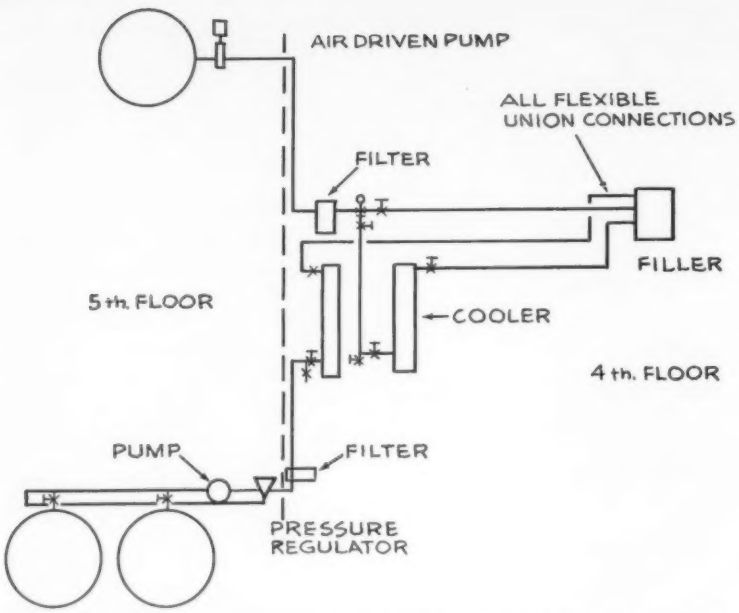


Fig. 1. Relationship of major components of aerosol operation. Note that there are two separate systems for concentrate handling — one for household items and one for cosmetic products.

steel) the product is filtered through a s.s. filter.

This is set in the line with unions so that it can be taken out and replaced by a similar length of pipe. The reason for this is that shaving cream concentrate does not lend itself readily to filtration without excessive foaming. (In making this product, all ingredients are carefully filtered before entering the tank which has been thoroughly cleaned.)

On the discharge side of the filter is a pressure gauge and a T. One leg of this T leads directly to the concentrate filler (for non-refrigerated items) and the other leg leads to the refrigerator.

The only comment we have on concentrate handling is the use of the air-operated pump. We would recommend its use on both cosmetic and household items since it is a very simple system. It eliminates the need for pressure regulator and by-pass. It pumps material only when needed and at whatever pressure it is set for. Compare this with the other system of pressure regulator and by-pass in which the product is always in motion.

Propellent System

Like the concentrate handling system, our propellent handling can be broken into two parts: namely, bulk and one-ton cylinders. See Photos 3 and 3a and Fig. 2. Our filling line is located on the fourth floor. Up to three one-ton cylinders can be simultaneously connected to an overhead pipe each thru a flexible hose.

This pipe joins a second one (bulk handling) by means of a T and both are so valved that one system can be shut off while the other is running. The propellent is then filtered thru a 200 micron filter. On the discharge side of the filter is another T. One branch leads to the pressure accumulator which is used for pressure filling. The other branch leads

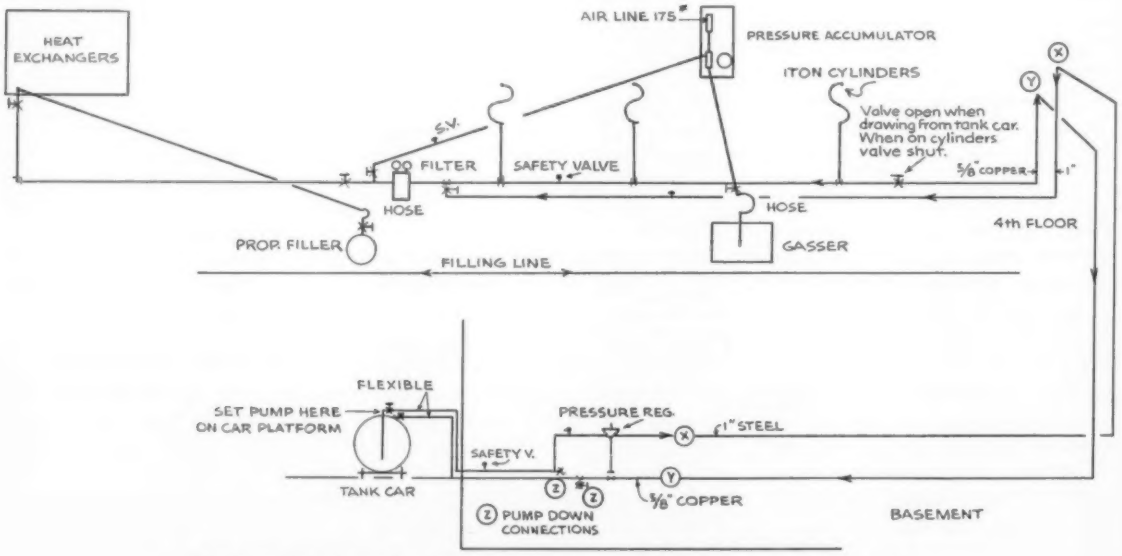


Fig. 2. Handling of propellent divides into two parts — one for bulk, and the other for one ton cylinders. Major feature of the bulk propellent handling is the pumping of propellent from a tank car directly to the fourth floor. Location of the pump (directly on tank car) makes this possible.

to the refrigerator and thence to the propellent filler.

At this point, it ought to be explained that our refrigerator contains three separate chiller pots, the temperature of each being individually controlled. One is for household items, one for cosmetics, and another for propellent. The only piece of equipment that the insecticides and cosmetics have in common is the filler and this can be very easily cleaned to prevent contamination.

Pump To Fourth Floor

We feel quite proud of our bulk propellent handling. As previously mentioned, our filling line is located on the fourth floor. We have no bulk storage. When the length of a run justifies the purchase of a tank car of propellent, we pump directly from the car to the fourth floor where the propellent is filtered, refrigerated, and passed on into the filler.

We haven't even a surge tank on the filling floor. Looking at Fig. 2, it can easily be seen how this is accomplished. The secret of this operation is the location of the pump (Viking, 8 gpm) directly on the tank car.

The suction side then consists of one straight piece of pipe from the bottom of the tank car to the top and one 90° elbow into the pump. In the basement adjacent to the car is located a filter, pressure regulator, and a by-pass back into the car. There is also a return line from the filling floor which joins in the basement with the return line from the pressure regulator by-pass back into the car.

Vapor Pressure Increase

Slightly "cracking" a valve on this return line on the filling floor causes this valve to act as an expansion valve and thereby increases the vapor pressure in the car. This final set-up is the result of many hours of downtime and countless trials and errors.

It is a pity, however, that the railroads will not permit shipping of this material in cars equipped with bottom discharge valves. Emptying,

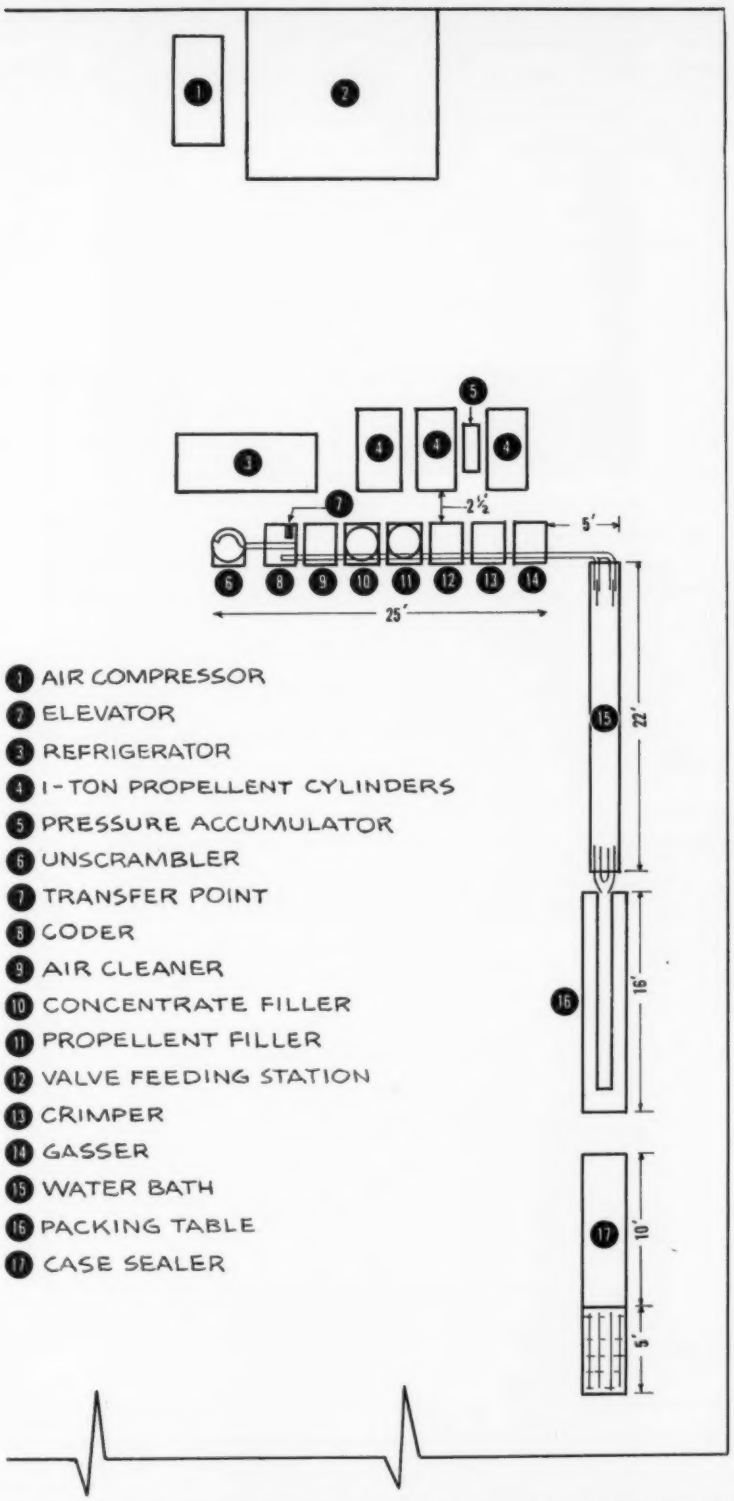
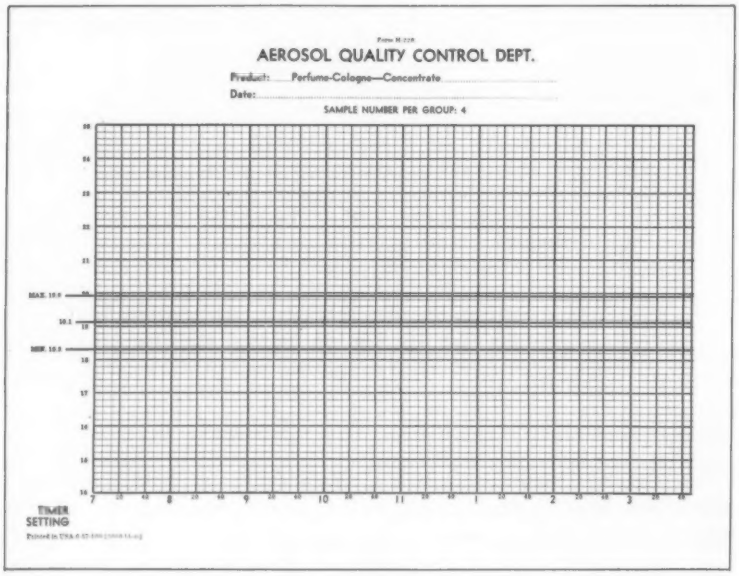


Fig. 3. As numbered from one through 17, these are the components of the filling line. The text of this article discusses the points of difficulty as well as of special interest involved in making this filling line successfully operable.

then, would be so simple. To offset their contention (as it was explained to us) that a bottom discharge valve could strike an object in the roadbed and break off with the resultant loss of the entire contents of the car, the following suggestion is made: Build a car with the discharge valve recessed in the body of the car. Surely, then, no object could strike the valve and break it.

At the beginning of our description of our bulk handling system we said that we were quite proud of it. We are, because as far as we are able to learn, ours is the only company pumping from a tank car to the fourth floor and directly into the filling operation. This we finally succeeded in accomplishing with no outside help and, indeed, in the face of expert advice that it couldn't be done. If any other company is so doing, we would like to hear from it so that we could compare notes.



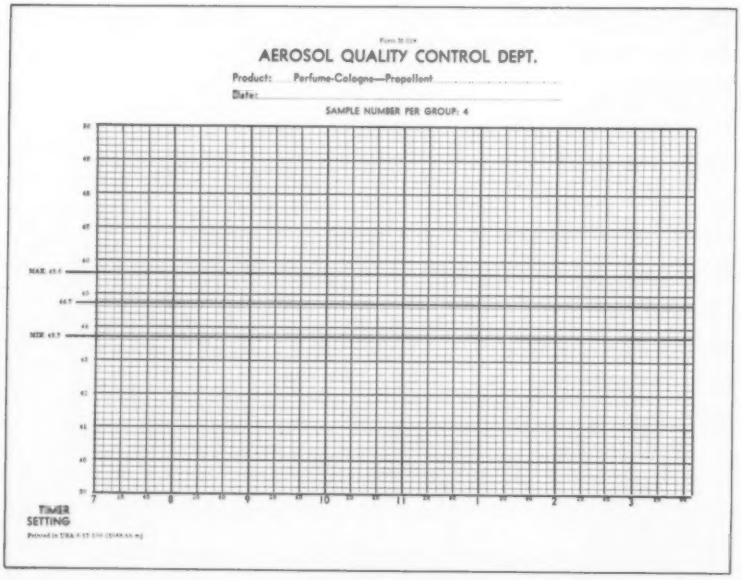


Fig. 4. These graphs show the application of statistical quality control to both concentrate and propellent — with a separate record kept for each. But on each graph the ordinate is marked off in grams of fill and the abcissa is in clock time spaced at 20 minute intervals. Each has three horizontal red lines drawn across it. Center line represents the ideal fill in grams and the upper and lower lines represent the maximum and minimum acceptable fills respectively. The quality control girl takes the weights every 20 minutes, calculates the average, and plots the graphs. If weights are outside of limits, she notifies the foreman immediately.

Filling Line Pointers

As for our filling line, (Photos 4, 5 and 6 along with Fig. 3) substantially describe it. Beginning with equipment marked "1" and proceeding through number "17", we shall describe our original difficulties and how we overcame them to date.

Do not underestimate the amount of compressed air you will need. We did, but luckily air was available from our present factory supply, so that we could pipe it in. We seriously underestimated the amount needed to dry the cans off as they emerged from the water bath. While not absolutely necessary, the installation of an aftercooler on the air line would increase the efficiency of the available air.

Be sure that your refrigeration is sufficient. It is better to have a little to spare rather than constantly be working the refrigerator at maximum capacity. Should that be so, it immediately precludes an increase in production rate. However, if there is more refrigeration available, at least, this will not be a stumbling block to greater line speed.

Solve Unscrambler Trouble

Our unscrambler gave us many headaches. Our predicament was that we bought a variable speed filling line, but a *fixed, constant-speed* unscrambler! This speed was set to coincide with our fastest anticipated production. When operating at any other speed, constant jams occurred at the point where the cans moved from the unscrambler chute to the belt and also at the transfer point.

Trouble was so frequent that we finally installed a micro switch at the transfer point which would automatically shut down the entire operation should a can be riding incorrectly on the belt. While this didn't cure the

Pinning down the details:

When we bought an air compressor capable of delivering 60 cubic feet a minute at 150 lbs. pressure, we believed this would be sufficient to run the various components of the line, *plus* the partial drying of cans emerging from the water bath. We soon found out that 60 cfm at 150 lbs. was enough to run the line, but we also found we needed about 40 cfm at approximately 80 lbs. pressure to blow on the cans emerging from our water bath. As noted in the text of our article, we overcame this deficit by tapping the compressed air system already installed in our factory.

If we were starting over, we would buy a compressor capable of delivering at least 100 cfm at approximately 100 lbs. pressure. We think that this would be sufficient for a line delivering about 40 cans a minute (cold fill) and about 16 cans a minute (pressure fill). Lines of greater speed would require more air.

B.H.B.

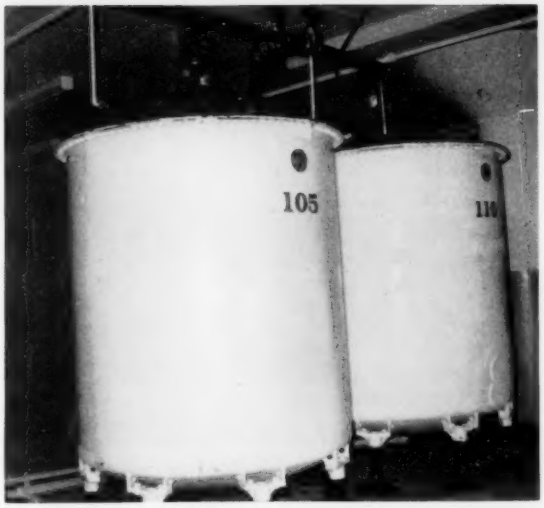
cause, at least it did eliminate throwing the belt out of time which usually happened when a jam occurred.

The ideal solution, of course, is to have the unscrambler equipped with variable speed and timed to the rest of the line. However, we have almost eliminated this trouble by installing strip springs on both sides of the can chute. This largely offsets the excess pressure exerted on the lead can in the chute caused by cans accumulating behind faster than they are taken away.

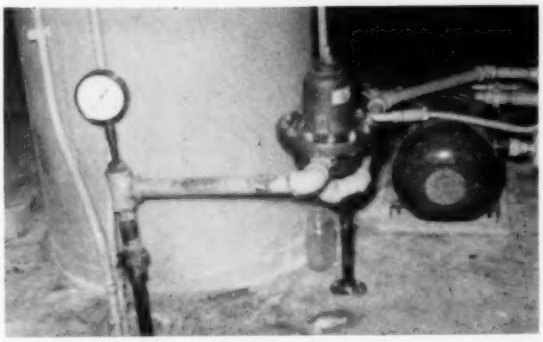
Watching Liquid Level

On each of the fillers we attached a micro switch to the float rod. Should the liquid level in the filler drop, this switch causes a loud horn to blare, alerting the foreman. This does away with low weights due to low liquid levels in the fillers. Although not yet installed, we intend to have a similar warning device sound when the inlet valve on either of the fillers sticks open and allows too much material to flow into the filler bowl.

Yet another future addition to each filler will be a thermometer immersed directly in the liquid in the filler bowl. While there are some



1. Insecticide storage tanks with agitators. Overhead piping is used in charging tanks from floor above. These tanks stand on the floor above the filling line.

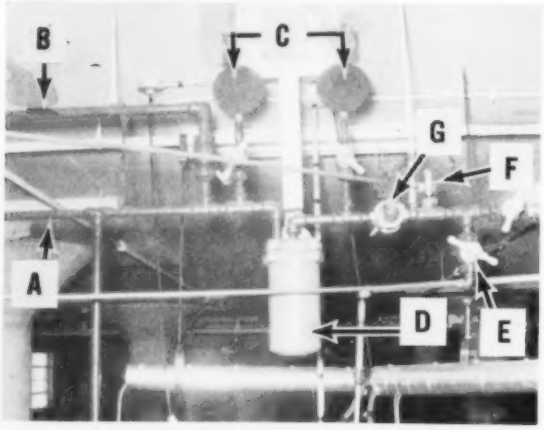


1a. Close-up of pressure regulator pump and by-pass on insecticide handling system — located on floor above filling line.

2. Stainless steel cosmetic storage tank located on floor above filling line and in turn charged from the floor above.

2a. Air-operated piston pump used in the pumping of cosmetics.

3. By means of flexible hose, three one-ton cylinders of propellent are connected to the handling system.



3a. Details of propellent handling: A. Propellent from one-ton cylinders; B. Propellent from tank car; C. Pressure gauges; D. 200-micron propellent filter; E. Valve leading to pressure accumulator; F. Pressure relief valve; G. Sight-flow gauge.

thermometers mounted on the refrigerator, we feel that these are not accurate and, after all, we are primarily interested in the temperature of the material in the filler.

While the gasser is adequate, quite a bit of propellent is lost on each stroke, which, we feel, is unnecessarily long. By decreasing the length of this stroke, we confidently expect a proportionate reduction in propellent loss can be effected.

In passing, it is worth mentioning that a simple electric counter is a worthwhile addition to the line.

Water Bath Changes

Two changes were made in our water bath. The inlet water valve (quick opening) was connected to the discharge valve (also quick opening) so that in one motion, should an emergency arise, the hot bath water could be dumped and, simultaneously, cold inlet water turned on. See Photo 7.

The inlet pipe of the water circulating system was located at the bottom of the tank at the end where the cans enter. When any leakers occurred, the surface of the bath water became contaminated at this point. Since the inlet pipe was located at the bottom, the surface remained relatively undisturbed with the result that when the cans broke the surface as they submerged, they picked up this scum which clung to them as they emerged at the opposite end — even though this water was clean.

It meant that each can had to be individually wiped. To overcome this situation, an extension was added to the inlet pipe an inch or so below the surface. Now, any contamination is picked up and pumped to the other end of the bath where the circulation of the water carries it to an overflow pipe and away.

Cradles For Cylinders

The last items to be discussed in the operation of our line are the cradles we designed and fabricated in our own shop for the one-ton propellent cylinders. See Photos 8 and 9. There is no estimating how much these have helped us in moving these

cylinders from their basement storage to and from the filling floor. It is possible for one man to move a loaded cylinder around with this cradle. It is a simple job for two men.

No such discussion would be complete without some mention of line personnel and direct labor costs. At this point it ought to be mentioned that one girl does all the statistical quality control weighings and graph plottings. Each product has two graphs — one for concentrate and one for propellent. See Fig. 4.

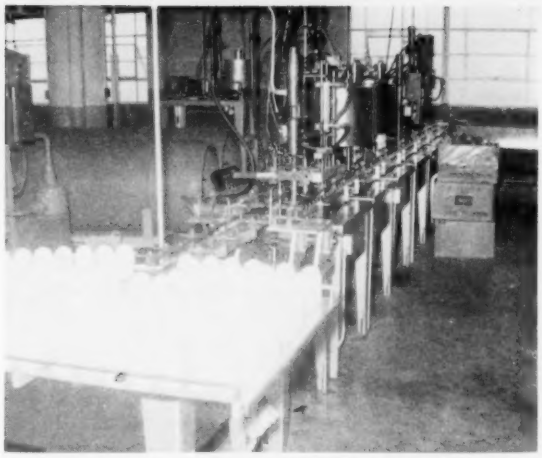
The ordinate is marked off in grams of fill and the abscissa is clock time spaced at 20-minute intervals. There are also three horizontal red lines drawn across the graph — the center one representing the ideal fill in grams, the upper being the maximum acceptable, and the lower one, the minimum acceptable. As the girl takes the weights every 20 minutes, calculates the average, and plots on the graph, she can easily see whether or not the weights fall within limits. If they do not, she alerts the foreman who immediately takes corrective measures.

Personnel Usage

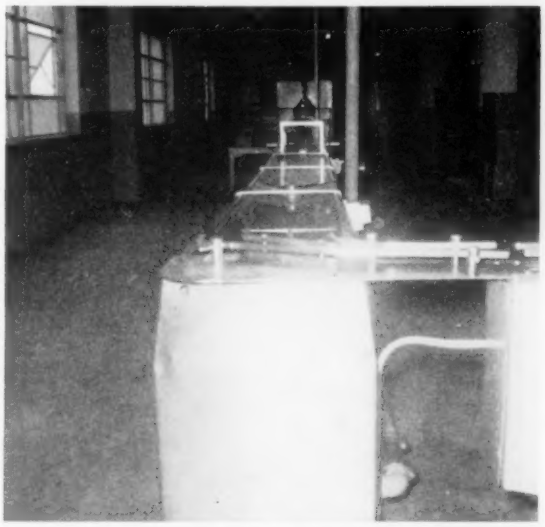
To date we have found that two men are ample to run the line efficiently. One services the entire line and the other is stationed at the water bath — detecting leakers. At no definite interval, but very often, this man tests cans for proper valve functioning as the cans emerge from the water bath. We feel that one hundred percent testing of valve function, while possibly desirable, is really unnecessary. To do this would require another girl on the line at an added unjustifiable cost.

In addition to the two men, we use four girls on household items: One at the unscrambler, one at the valve feeding station, and two at the packing table. The girl at the unscrambler inspects the empty cans before they are filled and the two packing girls also inspect before packing.

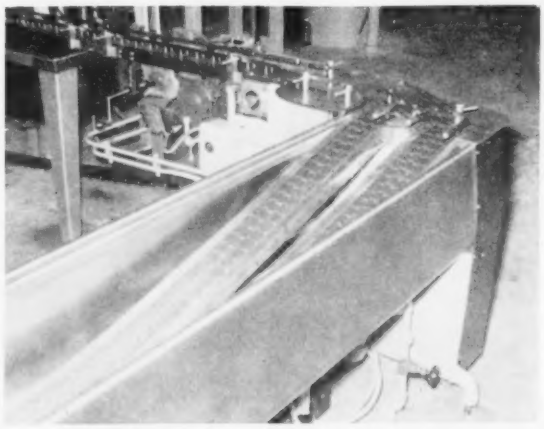
Our working day extends from 7 a.m. to 4 p.m. with the following breaks: A 15-minute morning coffee



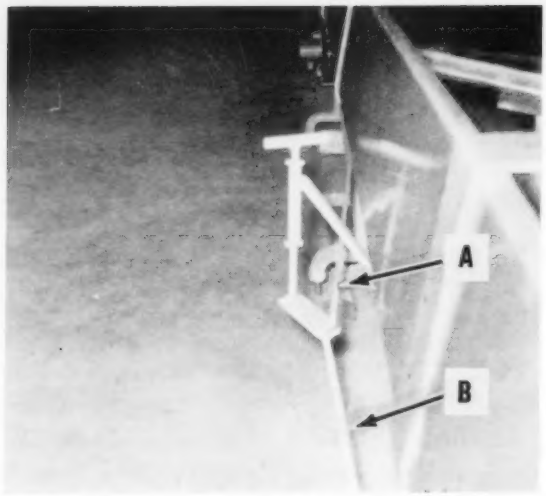
4. Positioning and relationship of principal components of filling line.



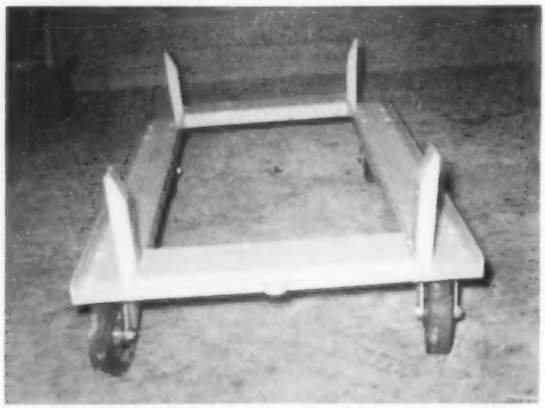
5. Aerosol container water bath in foreground. Drying and packing tables seen in background behind water bath area.



6. At this point filled aerosol cans enter the water bath.



7. With this arrangement in one motion the hot bath water is discharged and the cold inlet water is turned on. At A the rod is connected to discharge valve and at B the rod is connected to inlet valve.



8. Seen here empty, this cradle is used in holding and transporting one-ton cylinders of propellent.

9. This is how a ton cylinder fits into and rides on a propellent cradle.

break, one-hour lunch period, and a 5-minute afternoon break. This adds up to a total of 20 minutes of fixed downtime (excluding the lunch period). In this writer's experience, the following unproductive times quite generally exist and must be taken into consideration in any calculation:

Realistic Downtime

Morning startup, 10 minutes; coffee break shutdown and startup, at least 5 minutes; noon shutdown, 10 minutes; after lunch startup, 5 minutes, and evening shutdown, 15 minutes. This time, added to the regular morning and afternoon breaks, makes a total of 65 minutes of unproductive time per day.

Some readers might be ready to dispute these downtime figures. In many places, it is very possible that they might not be as high, but let's be realistic when calculating true production time. There is hardly a plant whose production begins immediately at the opening whistle and continues exactly up to each break or lunch period.

We all know that production stops some minutes before coffee break, lunch time, etc. Let's admit it and when calculating direct labor in terms of worker hours per unit or per dozen units, let's deal with actual times and not ideal ones. In this way, a true picture will be available.

Returning now to productive time calculations, we find that we must expect about 65 minutes of downtime every day. To this figure must also be added downtime due to unforeseen delays such as machine breakdown, material not available, etc. Based, again, on this writer's experience, a figure of 0.4 hour is used for this type of downtime. This makes a grand total of about 1.5 hours of expected downtime every day.

Direct Labor Details

The following direct labor statistics hold for our household items:

No. of personnel:	5 girls*
	2 men
Line speed:	40 cans/minute
No. productive hours:	6.5

(Continued on Page 72)

For more information circle No. 225 on Card →

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Ralph E. Yocom attended Oregon College of Education, following which he joined Monarch Finer Foods, a division of the Consolidated organization. His work there involved the processing and packaging of fruits. Subsequently he joined Consolidated's West Chicago, Illinois, plant, concentrating on the production and packaging of pickles. In 1951 he became plant manager of the coffee department of his company's River Grove plant.

In any effort to provide accurate control of package net weights, the human element is always a major factor. In this article Mr. Yocom traces the activities and relationships of five operating echelons within his organization. He emphasizes the personnel considerations that have a direct bearing on the quality and control of packages produced and he enumerates some significant control practices which his company finds useful.

The human side of net weight control

By Ralph E. Yocom,
Plant Manager,
Consolidated Food Processors, Inc.,
River Grove, Illinois

Maintaining adequate control of net weights of packages containing such a product as coffee is much like walking a tightrope with a long pipe in one hand and a weighted pail in the other. It is our practice to hold as closely as possible to exact weight and to avoid allowing a tolerance either way. Because of the competitive market for our product and the impact of governmental and local regulations, we take every precaution to avoid having an underweight package leave our plant. At the same time, we take similar precautions to avoid overweight packages. The aggregate effect of a small overage would soon have an erosive effect on our profit picture.

Our difficulty is compounded because of the tendency of small particles of product to lodge themselves well inside the various parts of our scale mechanisms. To offset this, we have established procedures regarding the adjustment and clean-up of our scales and related equipment.

Importance Of People

A major phase of our effort to maintain proper control of the net weight of our packages involves our attention to the human factors. This phase affects five distinct levels of personnel ranging from line worker through plant manager.

Although many of these functions and practices take place concurrently, for convenience of discussion, we shall group them by our personnel categories.

Our packaging lines use various standard units of packaging machinery. Further, our practices apply equally to our metal can packaging and our flexible packaging operations. In either case it is the basic responsibility of the line worker to watch the weights of packages being filled and to advise her supervisor just as soon as adjustment appears necessary.

In this connection we might emphasize that we maintain the strictest control over the fixing of responsibility for scale adjustment. Only the production superintendent, or in his absence, his assistant, makes this adjustment. All others are forbidden

to change or modify any scale or weight setting.

Fill Jobs Carefully

The starting point of our control of net weights is the type of individual hired for the job of running the filling scale. Our personnel representatives screen these people very carefully in the course of the hiring process. Our experience shows that neatness and the desire to do a good job are imperative if we are to have the type of employee who will properly control our package weights. Alertness and the ability to follow directions literally and without injecting alternatives are extremely important. A certain degree of manual or mechanical dexterity is quite helpful.

Interestingly enough, we have found a distinct correlation between the handwriting of an applicant and her performance on the packaging line. Our experience indicates that a girl who fills in her application with a clear, firm hand is more likely to be a good packaging machine attendant than one who writes it out very hastily or who prints it.

Value Of Consideration

Similarly, we have found a direct connection between the extra consideration we give our workers and the control we have over net weight. Even though our organization is highly unionized, we have found that special considerations instill in our people the desire to do a good job. Practically all of the girls on our production line are housewives who live in the vicinity of our plant. We have found it pays to be distinctly considerate in regard to absenteeism, rest periods, providing cool drinks on hot days, allowing time off for personal emergencies, and so on. It all makes these people inclined to do a better job for our company.

Apparently we have made our filling and weight control jobs quite desirable, in contrast to other jobs in our plant. These are actively sought even though the girls who do the filling and weighing work are on their feet all day.

The effect of our consideration of our people is that grievances turned

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in are almost nil. Further we are able to get the quality of packaging line performance that we want. Incidentally, we constantly stress to our people the competitive nature of our business and urge on them the importance of doing their best to see that all packages are satisfactory before they leave the plant. We think this added effort is worth making.

The girls who control the weights of our packages also perform various inspectional tasks. For example, they watch for bad seams on cans, dents, and other visual defects. Likewise they watch the coffee itself to be sure that a given grind gets into the appropriately marked can.

We have trained our line workers that their function when something appears wrong is to notify a superior. In this case, their immediate supervisor is a forelady.

Job Of The Forelady

She is concerned primarily with the performance and work of the girls on the line. She does not make equipment adjustments; in case of weight deviations her job is to report it to the working foreman or the production superintendent. The forelady must be the type of person who gets along with all of the girls on her line, regardless of personalities involved.

Similarly, she must be well acquainted with the various packaging operations and must be able to step in and do the job anywhere along the line. Her management of her line workers has a definite bearing on the maintenance of net weights.

The next echelon involves the working foreman. He is responsible primarily for the packaging machinery, as well as for the other equipment on our lines, including elevators, conveyors, closing machines, and the like. He must be well-versed in the working mechanism of the scale units, because he is the one who normally dismantles, cleans, and reassembles our scales.

Our practice calls for periodic complete clean-up of scales, such as once a week. It is often difficult to do this with any greater frequency because of the urgency of turning out production. For one thing, many scale units are involved and for another, our

production schedule is usually very tight.

How To Clean Scales

For a full clean-up, the scale must be completely dismantled. The working foreman takes one apart, cleans the different parts with a commercially available detergent, washing every part of the scale that can be washed. Actually his washing action is much like a dipping in and out process in order to get a swirling action.

This removes or loosens the product particles clinging to the scale mechanism. Following the washing process, he dries the scales with an air hose. This serves to blow off particles that are loosened but not removed by the washing process. Both the washing and drying operations must be thorough; the air hose is absolutely necessary to complement the work of the washing action.

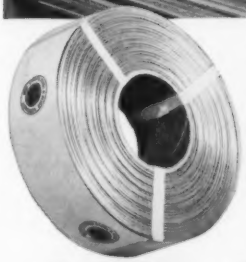
We make every effort to school our working foremen in proper scale clean-up and to supervise their work as closely as practicable.

Superintendent Trains Foremen

A significant point in connection with our management of the working foreman is that he gets training primarily from the production superintendent and not from another foreman. We feel this is very important. We want our foreman to learn his job as *we* have established it. By having the production superintendent advise and instruct him, we avoid the variations or omissions that might arise should another foreman give the instruction. This not only gives us a uniformity of training, but also a greater assurance of close attention to the intricacies of net weight control than otherwise would be the case.

In contrast to the thorough cleaning just described, we also have a standard practice for each day. The scales are lightly brushed with soft bristle brushes and are blown free of loose particles by means of the air hose. Our people do this at the end of each shift. Sometime the scales require adjustment at the start of the next day's run. If so, this is done by the production superintendent.

We also check-weigh the accuracy



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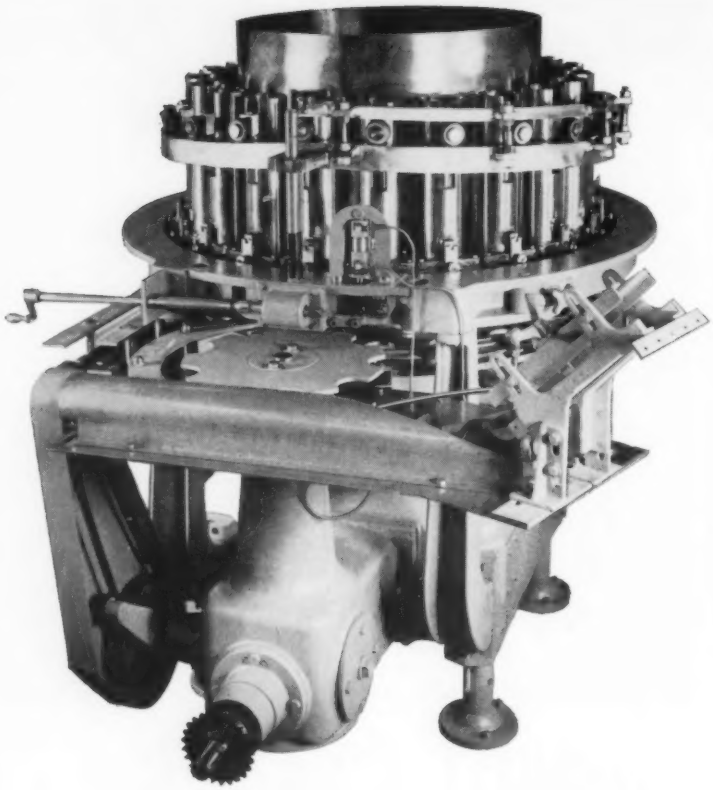

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of our filling scales periodically during the day. This is given special attention at the start of the production day, again at the morning coffee break, then at the end of the lunch period, and finally, at the conclusion of the afternoon coffee break. Each scale on the filling line is check-weighed with the check-weigher on the production line.

Perhaps the basic cause for a good deal of the inherent difficulty is that the oils in the coffee have the effect of sticking to scales, causing variations in weight. As a result of this tendency to stick to such equipment, our machinery must be scrutinized constantly.

Outside Checks Are Helpful

Incidentally, we find there is a very salutary effect in having outsiders check our scales. For example, these are checked periodically for accuracy by an outside inspector, either on behalf of a public agency or some private organization. This all ties in with our desire to maintain as closely as possible an accurate net weight with packages neither over nor under weight. In the course of our training and supervision work, we are constantly stressing to our foreladies, foremen, and production superintendents that they must watch these weight very carefully. We emphasize there cannot be a margin of being over or under weight.

Mechanically we have very little trouble. Our experience is that the equipment has been well developed by machinery makers and few mechanical difficulties arise in connection with our scale usage. Of course we realize our job in the matter and we realize that the equipment deserves all of the attention and careful maintenance that a delicate mechanism justifies.

To develop familiarity, we have a practice of assigning the same people to the same machinery groups or lines indefinitely — as far as possible. We do have rotation from job to job, but this is done on a particular line. By concentrating our people on given lines, we thus afford them the opportunity of developing a more intimate knowledge of their equipment than otherwise would be the case. At the

same time, they have enough rotation to offset monotony.

The Production Superintendent

In discussing the job of our production superintendent, we come to one of the focal points in our entire effort to control net weight. He is the one who makes the actual adjustment of the scales. Although we have a high degree of tolerance and flexibility in the control and management of the people on our lines, we are very strict on this one point; no one but the production superintendent makes an adjustment of the scales. Basically this is a very simple adjustment and takes little time or effort. This merely emphasizes our reason for maintaining a very tight control over the matter of the person to do it.

Because it is so easy to make, if we did not have strict discipline over the making of the adjustment, various people along the line might be tempted to do it. Our objection to this is that we would have no way of fixing responsibility for the adjustment. Our packages are coded. At any time we can trace one back to the specific day of its production. If we have just one person carrying the fixed responsibility for scale adjustment, in the event any question arises concerning our package weight, we can easily focus the responsibility involved.

It might appear that we would delay production unduly by insisting that just one person make the adjustment. For example, it could happen that the production superintendent could be in some far corner of the building when he was needed for an adjustment on one of the coffee packaging lines. We think that the time lost in awaiting his arrival is more than offset by the advantage gained by control and accountability of the adjustment.

Incidentally, the only time anyone else makes the adjustment is when the production superintendent is away. In his absence the assistant production superintendent makes it. If for any reason he too was unavailable, the adjustment would be made by a person selected by the plant manager and made under the personal supervision of the plant man-

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ager. All these precautions may seem excessive, but our experience with net weight control constrains us to emphasize that precautions are worth taking.

He Is Of Management

We regard our production superintendent as a part of management and we make him feel that he is part of management. In various ways we give him a feeling of great responsibility. His job demands a high degree of mechanical aptitude and he must know the working of virtually all the equipment in our plant.

We look to him for the improvement as well as for the control of operations. We consult him on all new equipment, on speed changes, as well as on alterations or modifications of existing equipment. His decisions and opinions are highly regarded. No change is made in production equipment without first discussing it with him.

Ordinarily we have the unanimous approval of top management, plant management, and production superintendent before making an equipment change.

If we contemplated installing equipment in which the production superintendent expressed some doubt, we should try to arrange for him to visit a plant using such equipment. We think that an interchange of plant visits between those in the same field is a distinct asset.

Either in an effort to solve a controversial question or simply to enhance his training and experience, we regard it advisable from time to time to let our superintendent make such visits to plants in the same field, to spend time talking to his opposite numbers there, and to satisfy himself concerning equipment under discussion. Such a practice is extremely beneficial to all concerned.

Role Of Plant Manager

The next echelon of management is the plant manager himself. We think it is important that he spend a good deal of time on the floor and that he take sample packages at random directly from the production line. Our practice is to take them from the line to the quality control department, where packages may be checked for weight, as well as for product grind and physical package characteristics such as can seams, closing vacuum, headspace, and the like.

Ordinarily the plant manager discusses matters with the production superintendent or the forelady or the working foreman. However, it is our practice to maintain an open door to all people on the line. Any of them may discuss any matter they desire directly with the plant manager. We have not experienced any abusing of this open door policy.

We think it makes a distinct contribution to the over-all effort in instilling quality consciousness and adequate control of net weights. Although the plant manager recognizes four distinct echelons functioning under him, he finds a definite value in having conversations with all of them from time to time.

All of these things contribute to the ultimate objective — a package that is of correct weight, neither over nor under.

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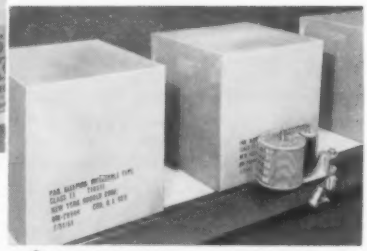

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Mr. Yocom's thorough treatment stressing the importance of individuals in maintenance of net weight and package quality control amplifies and confirms what other experts have stressed. In his article, "Maintaining net weights through quality control," (page 28 of our May 1957 issue), V. C. Bremer, quality control manager, C. F. Mueller Company, underscores the importance of proper training and adequate supervision of individuals responsible for net weights on packaging lines.

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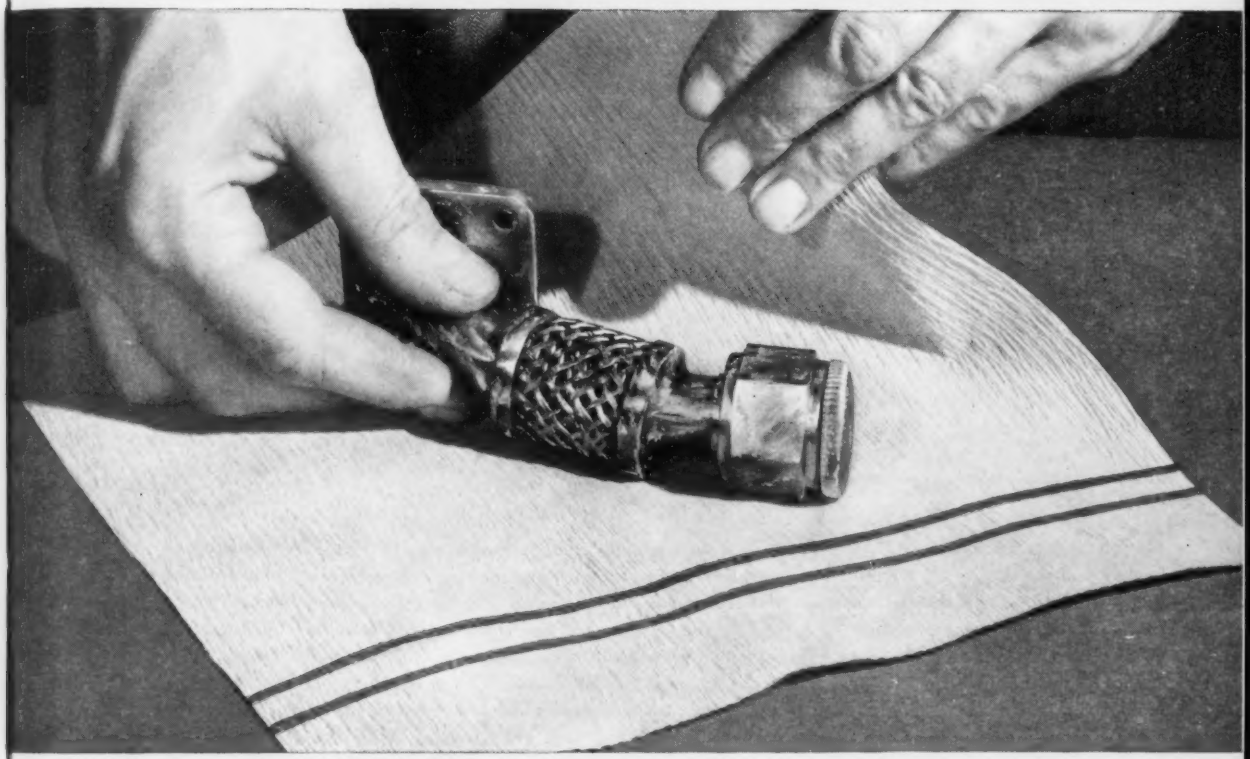

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LeRoy O. Anderson holds a B.S. degree in architecture from the University of Minnesota and has been employed by the Forest Service since 1934 — the past 15 years at the Forest Products Laboratory as an engineer. He has been closely associated with packaging research for 10 years and most of his work has been devoted to crate and container work, including the development of crate design standards. Mr. Anderson is a registered professional architect, a member of Forest Products Packaging Council, and of the Wisconsin Chapter of Sigma Xi. *This is Mr. Anderson's second article: His first one, "Technique of nailing a wood box," (as distinguished from a wood crate), appeared on page 21 of our June 1957 issue.*

Technique of Nailing a Wood Crate

By L. O. ANDERSON, Engineer, Forest Products Laboratory, Forest Service,
U. S. Department of Agriculture,
Madison, Wisconsin

Here is an unusually *comprehensive review of the details of fabrication and assembly nailing of sheathed and open crates. Reflecting the long and extensive experience of the Forest Products Laboratory in both the development and testing of sheathed and open crates, Mr. Anderson's article stresses the principles of good fabrication and assembly methods which are most conducive to the balancing of crate construction by use of correct materials (including nails) and methods, so that the crate successfully resists the rigors of shipping without damage.*

A well designed crate must be adequately nailed to utilize the maximum strength of its members. A good share of the failures that occur in wood crates can be traced to fasteners that were improperly used. The nails that fail most commonly in sheathed crates are those used to fasten the sides to the base because the nails used were either too small or too few. In open crates, fabrication nailing is the key to the strength of each side, end, or top panel. Assembly nailing of the sides to the base is also critical, because the fastening areas are usually limited to the struts and diagonals.

The construction of sheathed and open crates (Figs. 1 and 2) is quite different from that of wood boxes, but the principles of nailing are much the same. As in boxes, fabrication nailing consists of fastening the various members together to form rigid panels, and assembly nailing consists of fastening these panels together to make an enclosure suitable for the item to be shipped.

This article will present sound principles and methods of panel fabrication and crate assembly for both open and sheathed crates. The U. S. Forest Products Laboratory at Madison, Wis., has conducted container research projects for many years, and much of the development and testing work has been in the field of sheathed and open crates. The information concerning the principles of good fabrication and assembly methods presented herein has been based on this research. The sizes of nails recommended for assembly purposes are those generally used for woods in density groups I and II. When denser woods are used, the nail size can usually be reduced by one-penny.

Fabrication Nailing Of Panels For Open Crates

One of the simplest crates to build is the open crate. However, because of its simple form and minimum number of pieces, proper nailing is essential. As in most container fabrication methods, the clinched nail is the key to the strength of each panel. Panels for open crates are ordinarily made of 1″ lumber and are fabricated by placing the frame members flatwise across each other, nailing through both thicknesses, and clinching on the back face (Fig. 3). The side, end, and top panels of open crates are quite similar, and nailing methods are adaptable to all panels.

The nailing patterns, or the number and placement of nails for the crossing of members of varying widths, should be such that the maximum holding power is closely approached. Too many nails at these fabrication points will result in splitting when members are stressed. The

NOTE: The Forest Products Laboratory is maintained at Madison in cooperation with the University of Wisconsin.

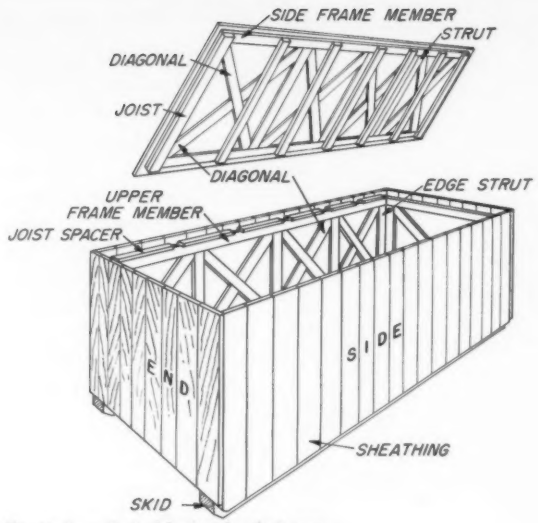

Figure 1. — Typical lumber-sheathed crate.

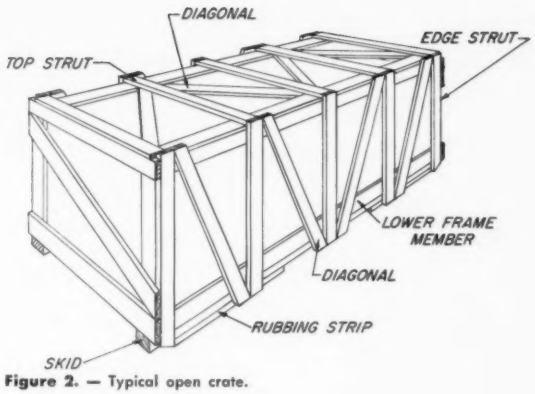

Figure 2. — Typical open crate.

recommended number for members of various widths is shown in Fig. 4. For frame members crossing at angles other than 90°, similar patterns should be used. These nailing patterns may be used for the base on those members not large enough to require bolts (Fig. 5). Members more than 2″ thick are normally fastened with bolts.

Sinkers, coolers, corkers, common, or other similar types of nails are used for panel fabrication. Nails with coated or roughened surfaces are not required for fabrication, as the clinch serves to resist withdrawal. It is good practice to clinch all nails when the total thickness of the members is 3″ or less. Because of the thickness of members used in open crates, the minimum nail clinch should be ¼″.

A good clinching rule is: Use a ¼″ minimum clinch for sevenpenny and smaller nails; a ⅜″ clinch for eightpenny through twelvepenny nails; and a ½″ clinch for longer nails. Too long a clinch is not desirable, however, because of the difficulty of burying the point. As in box fabrication, clinching the nail point across the grain of the wood

Table 1.—*Number of nails required to fasten sides to base of open crates (group II skids)*

Gross load (weight of crate and contents)	Total[1] minimum number and types of nails required			
	Sinker or cooler nails		Common nails	
	Eightpenny and ninepenny	Tenpenny	Eightpenny and ninepenny	Tenpenny
LB.				
1,000	20	18	16	14
2,000	38	36	30	26
3,000	58	54	46	40
4,000	76	72	60	52
5,000	96	90	76	66
6,000	114	108	90	78
7,000	134	126	106	92
8,000	152	144	120	104

[1]Use one-half on each side of crate and divide evenly between struts and diagonals by their respective widths.

Table 2.—*Number of nails[1] recommended per 1,000 pounds of gross load for nailing sides to base of a sheathed crate*

Nail type and size	Number of nails per 1,000 pounds gross load for skids of wood group		
	II	III	IV
Sinker or cooler			
Sevenpenny	23	26	19
Eightpenny or ninepenny	19	21	16
Tenpenny	18	19	14
Corker			
Eightpenny or ninepenny	17	19	14
Tenpenny	15	16	12
Common			
Sevenpenny	19	21	16
Eightpenny or ninepenny	15	17	13
Tenpenny	13	14	10

[1]Use one-half of total required for each side.

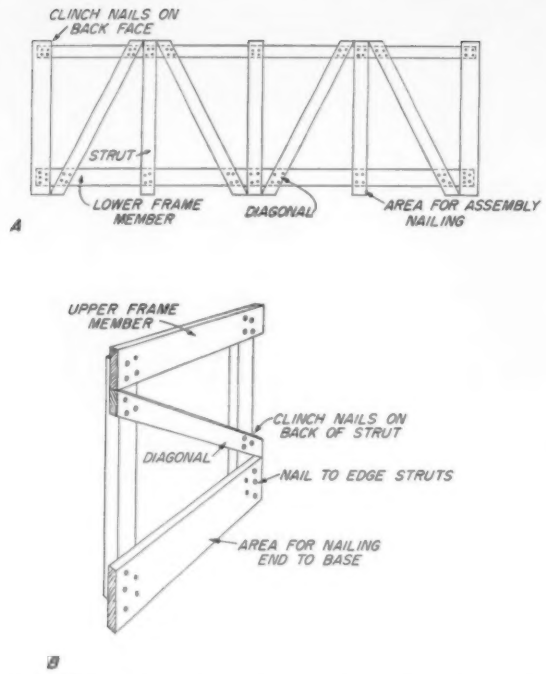

Figure 3. — Fabrication nailing of open crates. *A*, side or top panel, *B*, end panel.

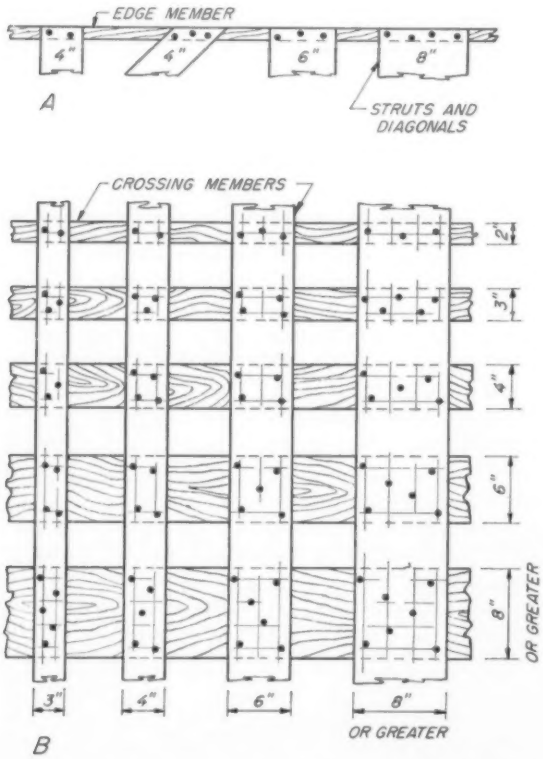

Figure 4. — Nailing patterns, *A*, placement of nails for crate assembly, *B*, placement of nails for fabrication of crate panels.

increases the withdrawal resistance.

Fabrication Nailing Of Panels For Sheathed Crates

Base. The fabrication of the bases for sheathed and open crates is similar and involves the use of bolts for their heavier members. The members usually bolted with carriage or similar bolts include the end headers, the load-bearing members, and the skids (Fig. 5). The remaining members, such as cross members, diagonals, and plywood flooring are nailed to the skids, according to the details in Fig. 5.

The nails used should be long so that the portion penetrating the skid is two to two and a half times the thickness of the member holding the head, and not less than 1½". For example, a ¾" thick member nailed to the skid requires a nail about 2¼" to 2⅝" long. Choices might be an eightpenny or ninepenny sinker nail with some type of coating or an eightpenny common nail with an etched surface. Many deformed-shank nails also provide excellent withdrawal resistance. However, if clinching is required because the total thickness of all parts is no greater than 3", the nails need not be coated or etched, as the clinch provides the holding power.

Sides, ends, and top. The sides, ends, and tops of sheathed crates are usually fabricated by placing the precut frame members in their proper positions, and fastening each adjoining member with corrugated fasteners or with staples to form a framework to which sheathing can be nailed. If a number of crates of the same size are constructed, jigs may be used to hold the members in place while sheathing is applied. The type of nail and the length of the clinch should be the same as recommended for the fabrication of open crates.

However, when plywood less than ½" thick is nailed to 2" frame members, the nails should penetrate at least 1½" into the member, but ordinarily need not be clinched. The spacing and placement of the nails should generally conform to that shown in Fig. 6. The rule that calls for driving nails through the thinner

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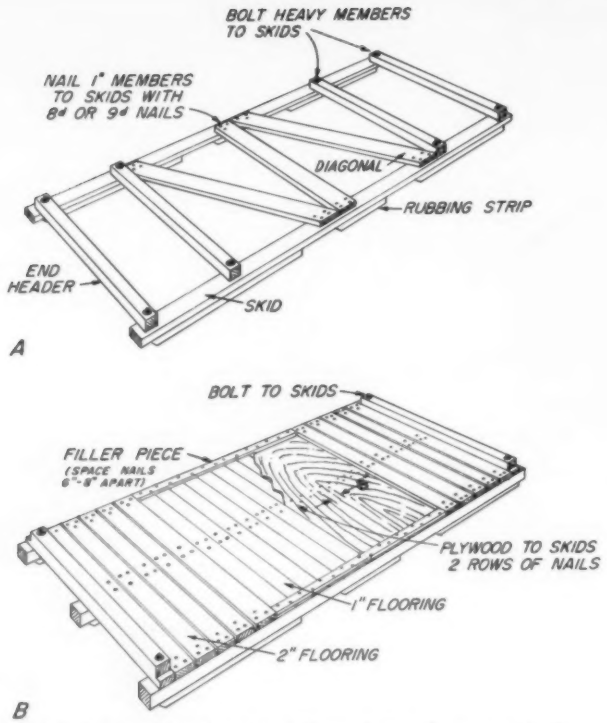


Figure 5. — Fabrication of crate bases, A, base for open crate, B, base for sheathed crate.

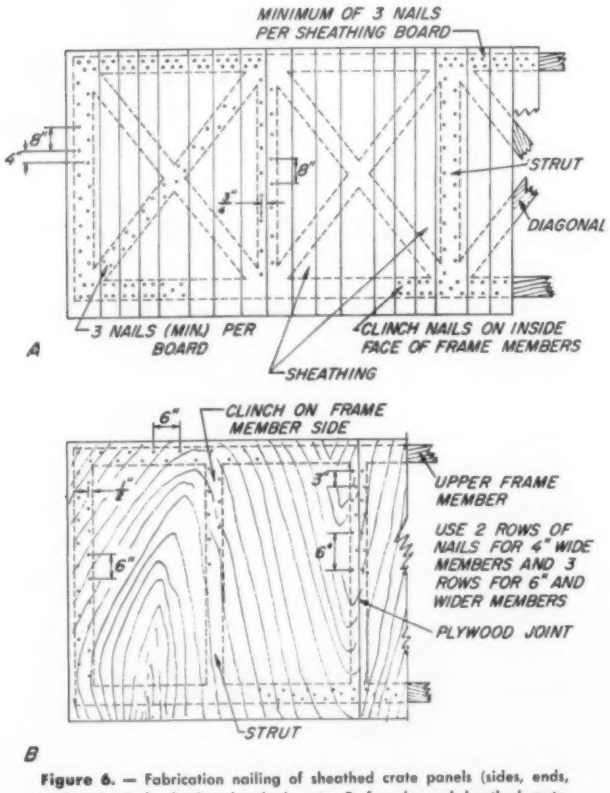


Figure 6. — Fabrication nailing of sheathed crate panels (sides, ends, and top). A, for lumber-sheathed crate; B, for plywood-sheathed crate.

part into the thicker member applies in the fabrication of crates, and when members are of equal thickness convenience of nailing should be the controlling factor.

The construction of the top usually includes joists or similar supporting members that must be fastened. If these members are to be on edge, they are fastened to the top either before or during crate assembly by nailing through the sheathing and 1" frame members into the edge of the joist. Two nails are used where each joist crosses a diagonal or a longitudinal member. Twelvepenny nails are suitable when the sheathing consists of nominal 1" boards, and tenpenny nails when the sheathing used is $\frac{3}{8}$" or $\frac{1}{2}$" plywood. Nails driven through a frame member parallel to the joist are spaced about 8" to 10" apart.

The principles outlined also apply to variations in crate style or member arrangement not covered in this description of crate fabrication.

Assembly Nailing Of Open Crates

The assembly nailing of open crates is relatively simple, as there is no great amount of "blind" nailing involved; that is, the pieces holding the nailhead and point are in plain view (Fig. 7). For this reason, most open crates need not be accurately marked for alignment of the assembly nails. Coated or etched nails or nails with deformed shanks provide good withdrawal resistance.

Fastening sides to base. The struts and diagonals of the sides should be nailed to the skids or other structural members of the base. The number of nails used is determined by the gross weight of the crate. However, a minimum of two nails should be used for each one by four fastening member, and three nails for each one by six or larger fastening member, when skids are 2" thick.

When skids are more than 2" deep, a minimum of three nails are used for one by four members, and four nails for one by six or larger fastening members. However, for each crate, it is necessary to base the number of nails on the gross weight. Table 1 lists the total number of

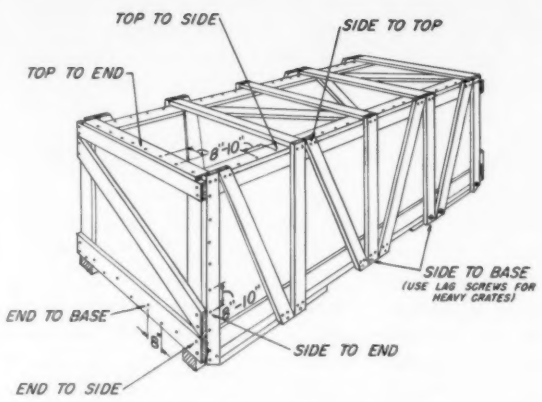


Figure 7. — Assembly nailing for an open crate.

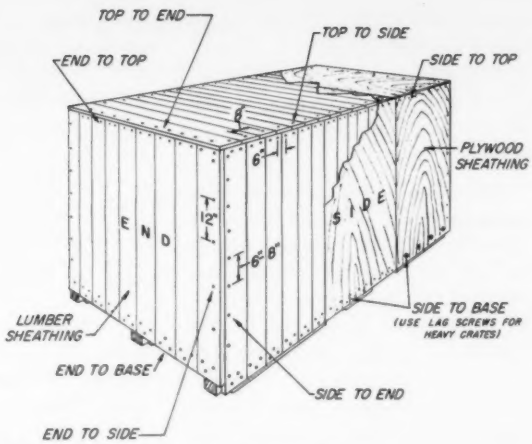


Figure 8. — Assembly nailing for a sheathed crate.

nails required to fasten the sides to the base for various gross loads.

The nails should be placed in staggered rows in patterns similar to those shown in Figs. 4 and 7. As shown in Table 1, eightpenny, ninepenny, or tenpenny nails are recommended for nailing 1″ members to the base.

For heavy items in small crates, the number of nails required is often so great that splitting of struts or diagonals may occur. Under these conditions, the use of lag screws or lag screws and timber connectors is recommended. The allowable lateral resistance of a ⅜″ diameter lag screw that penetrates 1½″ to 2″ into the skid is at least four times that of an eightpenny sinker nail. Thus, two lag screws will do the work of eight nails and require a smaller fastening area.

Fastening sides to ends and top. In most open crate designs, the members are arranged so that the sides can be fastened to both the end and top panels. The edge struts of the sides overlap the edge struts of the ends and are nailed with eightpenny or ninepenny nails spaced 8″ to 10″ apart (Fig. 7).

The upper ends of the struts and the diagonals should be nailed to the longitudinal members of the top with eightpenny or ninepenny nails, as shown in Fig. 7, for open-crate assembly.

Fastening ends to sides. The cross members and the diagonals of the ends in many open crates are arranged so that they can be nailed to the edge struts of the sides (Fig. 7). Use two eightpenny or ninepenny nails for one by four end members, and three nails for one by six and wider end members. If close edge nailing causes splitting, it can be reduced somewhat by slightly blunting the ends of the nails, or using nails onepenny size smaller.

Fastening top to ends and sides. The construction of the tops for open crates may vary somewhat, but the principles of good nailing still apply. In Fig. 7, the longitudinal members and the edge members of the top are nailed to the upper longitudinal members of the sides and ends respectively, with eightpenny or ninepenny nails spaced 8″ to 10″ apart.

Assembly Nailing Of Sheathed Crates

The principles of assembly for sheathed and open crates are similar. The greater nailing areas in a sheathed crate allow for more uniform nail spacing, and eliminate the concentrations of nails that often occur in the assembly of open crates.

Sheathed crates can be designed to carry greater loads than open crates. One reason is that the greater fastening areas allow more fastenings and therefore greater resistance to lateral loads in the side-to-base assembly. In small open crates with heavy loads, only two or three members may be available for this fastening, whereas sheathed crates can be nailed along the entire length of the crate. As in all assembly procedures, coated or etched nails or one of the various deformed-shank nails may be used to provide superior withdrawal resistance.

Fastening sides and ends to base. The sides and ends of sheathed crates are nailed to the skids and end header, or to the sills in a sill-type base. When two by four skids or headers are used in a flat position, the nails should be in a single row in a staggered pattern; when 3″ or 4″ skids or sills are used, the nails should be placed in two rows in a staggered pattern; and when members are deeper than 4″, three rows should be used.

It is good practice to use eightpenny or ninepenny nails for 1″ lumber sheathing, and sevenpenny nails for plywood sheathing less than ½″ thick. The total minimum number of nails for the side-to-base nailing is governed by the gross weight of the crate and its contents. Table 2 lists, by types of nails and wood groups, the number of nails required for each 1,000 pounds of gross load.

While Table 2 lists the number of nails for fastening sides to base, it is good practice to use at least two nails in each lumber sheathing board. In addition, for both sides and ends, nails should be spaced no farther apart than 3″ for single rows, 6″ for double rows, and 9″ for nails placed in three rows (Fig. 8). If nail

requirements are such that the nails must be spaced less than 1½" apart in a single row, nails should be replaced with lag screws, as described for the side-to-base assembly of open crates.

Fastening sides to ends and ends to sides. The side panels are fastened to the end panels by nailing through the sheathing into the edge struts of the ends, spacing the nails 6" to 8" apart, as in Fig. 8. The size of nail depends on the type and thickness of the sheathing, but eightpenny or ninepenny nails may be used for 1" lumber sheathing, sevenpenny nails for ⅜" plywood, and eightpenny nails for ½" and thicker plywood.

The end panels are fastened to the side panels by nailing through the sheathing and edge strut of the end into the edge strut of the side, which is usually a 2" or thicker member. For lumber sheathing, this nailing procedure requires twentypenny nails and predrilled holes. A ⅛" or slightly larger drill is satisfactory for most wood species. For ⅜" or ½" plywood, a twelvepenny nail is satisfactory. Nails should be spaced about 12" apart (Fig. 8).

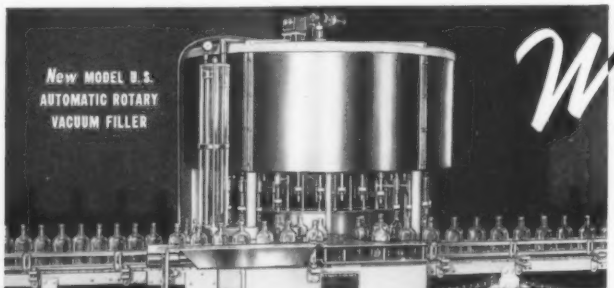
This type of two-way nailing, sides to ends and ends to sides, provides a very rigid corner as, no matter how the corner is stressed during shipping and handling, at least one set of nails provides lateral resistance.

Fastening top to sides and ends. The construction of the top can vary a great deal in sheathed crates. Narrow crates do not require top joints to support top loads, as the sheathing alone has sufficient resistance. Wider crates, however, use a system of joists to carry these loads. Because of these and other variations, such as joist support systems, the nailing often varies a great deal. Whenever possible, however, two-way nailing should be used.

The nails used to fasten the sides and ends to the top are driven through the sheathing into an edge or other member of the top framing. Eightpenny or ninepenny nails are used for lumber sheathing, and sevenpenny nails for plywood sheathing less than ½" thick. These nails should be spaced about 6" apart (Fig. 8).

The top is fastened to the sides and ends by nailing through the sheathing and edge members of the top into the upper frame members or joist spacers of the sides and ends. When frame members of the top are made of nominal 1" material, twelvepenny nails provide a 1½" minimum penetration. For ⅜" or ½" plywood sheathing, tenpenny nails should be satisfactory. Nails should be spaced about 8" apart (Fig. 8).

The principles of nailing which have been included in the details of fabrication and assembly nailing of sheathed and open crates can be adapted to similar containers. Balanced construction is achieved in a crate by using the correct materials, including nails, in the right way, so that it can resist the hazards of shipping without damage.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Wayne E. Rathbun has been associated with Sheffield Tube Corporation ten years and has been its plant manager for the past two years. Prior to joining Sheffield, he was associated with General Dynamics Corporation and the Connecticut Light and Power Company. Under his direction the production of collapsible tubes at his plant increased ten per cent the current year.

The vagaries of chemical reactions between a product and its package often have disastrous consequences. To avoid such effects in the case of collapsible tubes, there are various linings and combinations that meet such needs. In this article, Mr. Rathbun discusses tube metals, product compatibility problems, and the choice and use of liners to solve these problems.

The role of linings in collapsible tubes

By Wayne E. Rathbun,
Plant Manager,
The Sheffield Tube Corporation,
New London, Connecticut

There are few examples of the delicacy of the product-package relationship more graphic than that of a collapsible metal tube and the product it contains. Since collapsible tubes are made of three basic metals and since there is an almost limitless range of products to go into them, we have abundant opportunities for chemical reactions between package and product. At first glance it might appear that compatibility between the two is often unattainable.

However, the use of a variety of linings is the key to this compatibility. Reduced to essentials, the basic purpose of a tube lining is to avoid the effects of chemical reactions which might occur between the tube and its contents. Also, the liner is more than just a buffer between the metal and the product. Properly chosen, it makes a distinct contribution to package effectiveness.

Metals primarily used for collapsible tubes include aluminum, 99.7% pure; lead with an antimonial content for hardening it; and tin, either as pure tin or as tin-coated lead. Sometimes there are combinations of lead and tin, such as 3% to 7.5% alloyed to make one metal. Another example is tin-coated lead, a lead core with tin coating inside and out.

Selecting The Tube Metal

In determining the specifications for a collapsible tube, first attention goes to the choice of metal. In this connection it is necessary to have an adequate knowledge of the product going into the tube. Without reference to choice of linings, it is important first to review the product in the light of the metal under consideration. For example, aluminum is weak in chemical resistance to products that are highly ionized, either in the acid or alkaline range. These tubes to a large extent require resistant linings such as phenolic or epoxy resins. On the other hand, compared to aluminum, lead is much less affected by this type of product, but it does often require a protective liner. Tin is probably the most satisfactory metal from the standpoint of performance. It is less chemically active than the other two metals, yet for some products, a liner is necessary even in a tin tube.

In a typical case of chemical reaction between tube and product, the result is the formation of gases. Pressure builds up and the tube becomes vulnerable to bursting. Also, the very action that develops the gases digests the metal. This may result in perforations or pin-holes in the container. A discoloration of the product may result at the same time.

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Choice Of Lining

Thus, the primary objective of a lining is to avoid the effect of a chemical reaction such as that suggested above. Primarily the following liners are available for use with collapsible tubes:

Phenolic resin. This is probably the most chemically resistant lining available. Unmodified, it is brittle; for other than rigid containers it is usually modified to provide adhesion and flexibility in such a manner as not to reduce its resistance qualities. Phenolic resin is capable of considerable resistance when baked at temperatures up to 300°F., and is used in this manner with metals that cannot withstand baking above this point. Its fullest resistance is secured, however, by baking for a prescribed time in the area of 400°F. Such heat application converts or joins the suspended resin particles in a molecular union producing a film as impermeable and insoluble as a coating can be. Phenolic resin liners have been successfully used with a large number of products including foodstuffs, but in this last connection in particular the lining chemist is aware that phenolic resin can influence the food's taste, and he considers carefully the product involved.

Epoxy resin. This is close to phenolic resin in general chemical resistance and is preferred in some instances. Its chemical resistance is increased in proportion to the degree it is cured or converted. It is activated by the addition of a catalyst at some point before application to the tube, and maintaining maximum quality is a matter of strict control from the coatings manufacturer to its end use.

Phenolic-epoxy resin. This liner combines many desirable qualities of each resin and reduces the hazard of premature reaction inherent in straight epoxy resin. It is a combination liner coming into increasing use.

Plastic resins. Vinyl, acrylic, and other synthetic resin liners are used to a considerable extent. Water-white in color, they are used as clear coatings and are also pigmented with

titanium dioxide. Addition of the white titanium dioxide permits determining completion of coverage and provides the psychological value of cleanliness for pharmaceuticals and foodstuffs, for example.

Wax linings. These liners utilize materials of a petroleum base which are sometimes fortified with synthetic resins and have been long in use with lead tubes for packaging such products as toothpaste. Wax linings applied hot provide a thickness of liner not otherwise secured, and when modified with wax-soluble synthetic resins, they provide not only this fullness of coating, but, in a manner of speaking, a second resistant liner within the wax. In lining aluminum tubes to contain chemically active products, a wax lining may be applied over a phenolic or epoxy resin coating to provide an added margin of safety against the resin liner cracking in closure after filling, or from flexing of the comparatively stiff metal in subsequent use. The second coating of wax also delays the ultimate attack on the more resistant base liner, and together they provide a successfully lined aluminum tube.

Double wax linings have also been found useful for certain products.

Use Of An Inhibitor

In the case of an alkaline product such as shampoo or shaving cream, packaging in unlined aluminum would be impossible except for the use of an inhibitor. Sodium silicate is the one generally used. This is incorporated into the product at the time of its manufacture. When packaged, the hydroxyl radicals from the product start to react with the aluminum ions of the tube metal. At this point, the silicate steps in to form a complex, inert salt which forms a coating on the inner surface of the tube and prevents further reaction between the product and the metal. This short reaction occurs without danger to the soap-type product and dispenses with the need for a liner.

Opportunities For Reaction

If the product absorbs the liner, the liner then becomes a part of the product. It is possible that there

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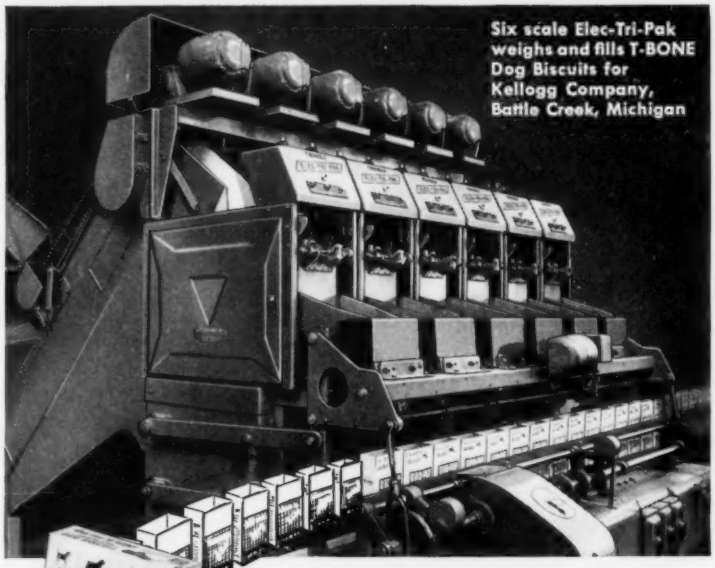

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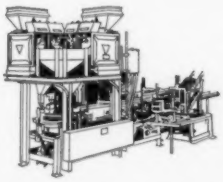

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could be a chemical incompatibility between the product and the liner in which case there might be a reaction between a liner and one or more ingredients in a product.

Further, unless one chooses a liner correctly, there could be a liner representing a physical barrier between the metal and the product which would be impassable to solids and perhaps to liquids, but which could be penetrated by gases and fumes. These could pass through an otherwise satisfactory liner and attack the metal of the tube.

Note Film Integrity

This emphasizes another consideration in choosing a liner: Choose it for its film integrity. Continuous oxidation, cracking, permeability, and general vulnerability of a liner must be considered. Also, attention must be given to maintenance of the liner over an extended period of time — the useful life of the packaged product. This period of aging is important as it relates to other factors, namely variations in temperature and shock of shipment and handling.

Vulnerability Of Liners To Metals

Certain metals render themselves difficult as tube materials because of the inherent difficulty of protecting them with a liner. For example, aluminum does not have a smooth surface as extruded in a tube. Rather, it has a large number of microscopic fissures. The metal is stiff and easily scratched. Care must be taken that all scratches and fissures are completely covered by the liner.

With a single liner in an aluminum tube, the surfaces of the metal might penetrate the liner because of their sharp characteristics. However, the use of a second layer, such as wax, protects against this penetration. The second coating is almost always wax, since a coating like phenolic resin, being brittle, would be even more likely to crack than an initial coating of this nature. It is important to have a coating which, in effect, bends with the metal. In this connection, it may be helpful to fortify the wax with a synthetic resin in

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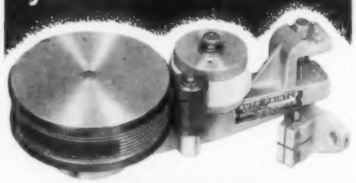

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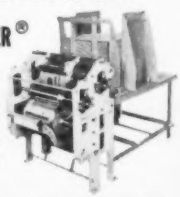

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Product Vs. Liners

Liners must not be vulnerable to penetration by the product or any of its ingredients. Salt, for example, must not get through to an aluminum tube or it will attack the metal. The more chemically-active products require the more resistant liners. In aluminum tubes, products that are highly acid, highly alkaline, or have a high percentage of salts or halides, make the use of a protective liner imperative.

Application Of Heat

In our previous reference to phenolic and epoxy resin liners it became clear that baking at established temperatures influences the resistance of the liners. The same is true to a lesser extent with vinyl and acrylic resin coatings, where temperatures, often just above the boiling point of the solvent used as a reducing agent, are required in order to remove the solvent and to fuse the resin particles more closely together. The solvent must not be trapped in such coatings and the resin must be fused together properly, for failure to do so will lead to easier penetration of the resultant coating.

It is necessary to consider the end use when choosing plastic resin liners. Products filled at high temperatures will soften plastics in relation to the degree of heat involved, and can cause premature penetration of the product into the liner.

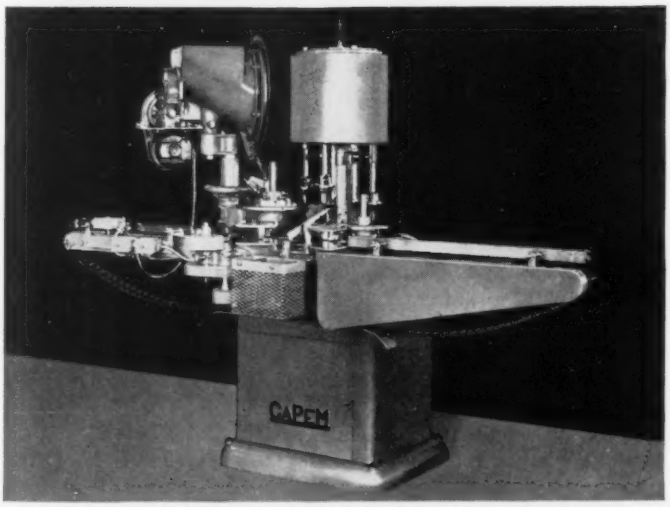
In this connection, it is helpful to remember where wax and phenolic resin are applied to the same tube that the wax application follows that of the phenolic. A controlled heat is necessary. Likewise, it is necessary that the temperature of the product be controlled while it is being filled. Without such control, heat in excess at the time of filling might soften and break down the wax lining. However, the melting point of the wax liner is sufficiently high to protect against unfavorable reactions at all ordinary temperatures, even those of tropical climates.

In the final analysis, even the most carefully selected metal and lining requires thorough testing under accelerated shelf life conditions and at high temperatures. Also, lengthy exposure to actual usage conditions may be the final arbiter of what constitutes a properly selected combination of tube and liner.

You must know your product

The chemical intricacies of Mr. Rathbun's discussion emphasize the importance of knowing enough about the product. Unfortunately, too many packaging specialists undertake to solve their packaging problem without a thorough knowledge of the product and its properties. Such a study pays dividends in successful packaging.

CAPEM THE MODERN SCREW CAPPER



- Applies any type of standard screw cap or cover at speeds of 2,000 to 10,000 per hour.
- Takes container from conveyor line, applies cap perfectly, and returns container to conveyor AUTOMATICALLY without intermediate handling.
- Handles bottles, jars, cans or jugs of any size or shape.
- Delivers a perfect, LEAKPROOF seal at low cost.
- Available in 1, 2, 4, 6 and 8 spindle models.

Write for prices and delivery

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Buffalo 13, New York

Allyn C. Beardsell is a graduate of Harvard University with an A. B. degree. Prior to joining Container Laboratories in 1949, he was supervisor and director of the Eastern Division Package Laboratories of Hinde & Dauch and coordinator of packaging, shipping, and warehousing of Western Electric Company. A member of Packaging Institute, he is chairman of its Corrugated and Solid Fibre Shipping Container committee, is a member of the Container and Material Testing committee of American Ordnance Association, and is president and former director of the New York chapter of SIPMHE. He is a member of the Cold Storage Research Advisory Committee of the Department of Agriculture and is a member of the Scientific Advisory Council of the Refrigeration Research Foundation.

A topic that is arousing increasingly widespread interest is the development and preparation of specifications for corrugated and solid fibre boxes. Unfortunately, some specifications are excessively detailed and yet fail to cover points of major significance. Others are too skeletal. Mr. Beardsell sets forth the salient features of a good specification and furnishes an explanation of the reasons underlying the importance of these features.

How good is your fibreboard box specification?

By Allyn C. Beardsell,
President,
Container Laboratories, Inc.,
New York

The competitive marketing conditions in which we find ourselves today are constantly demanding a review of our costs to do business. Packaging is subjected to this constant analysis of performing the protection of our products at lower costs. As a result, many companies are finding themselves at a point of no return below which they believe cost cutting is impossible without endangering the protection to the product.

Yet this level of protection, in the case of fibreboard, is based on a broad variability of the board and the fabrication into boxes which is rarely fully recognized. Controlling these variations frequently permits further reduction in cost since the protection of the product need not be geared to the lowest value in these quality variations.

It is the purpose of a good specification of fibreboard to assure uniform performance of the fabricated box in handling, warehousing, and shipping. Needless to say, complete specifications for fibreboard have been used for many years by companies who have recognized the value of controlling the quality of all their purchased materials. Yet, millions of boxes are purchased each year, either on the basis of "as had in previous order" or simply by specifying size, test of board, and printing.

Is it surprising then, that with no apparent changes in the packaging or the product, suddenly excessive damage occurs or collapse of storage stacks takes place? Is it surprising that we are frequently paying a premium price for a better grade of container to allow for that one lot in a hundred which may have crept in with poor quality in our previous experience with a somewhat lower grade of material?

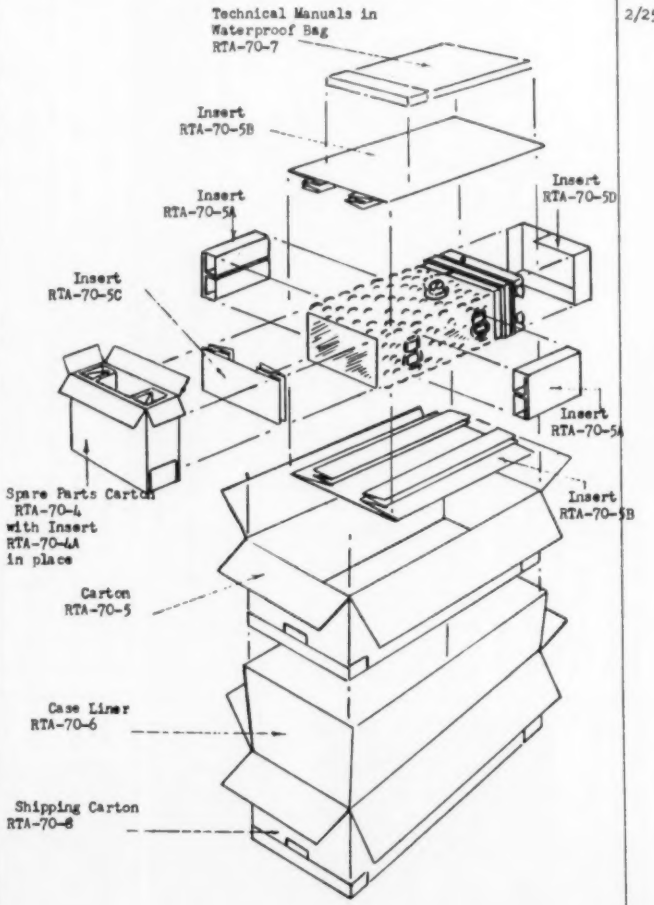
Generally, fibreboard specifications are best handled by a breakdown into (1) a purchase specification and (2) a general specification. The purchase specification identifies a container as to size, test of board, flute, printing, and other specific details applying to a given container. The general specification, on the other hand, fully identifies all basic requirements of the board and containers used by a company and enumerates controls and procedures for the checking of the quality for any type of box purchased.

It is the purpose of this article to discuss the elements of a good general specification in detail.

General Specification

A general specification for corrugated board should include the various types of basic materials used in the manufacture of the board and the fabricated boxes or packaging components, the minima and/or maxi-

Clarity of detail and precision of notation are important features of any specification. This facsimile of a typical workable specification includes easily understood, exploded drawings, and adequate enumeration of specific dimensions and their points of applicability.



ISSUE: 1 2/25/52

USED FOR PACKING

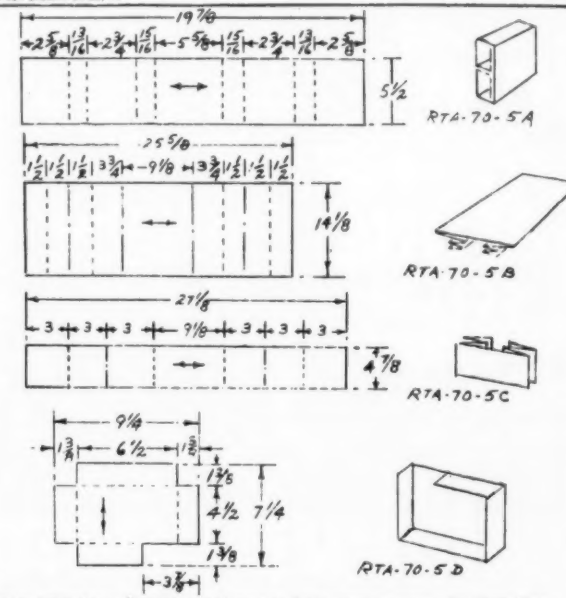
MODIFIED EXPORT PACKAGING AND DOMESTIC PACKING FOR ONE RECEIVER TRANSMITTER RT--, SPARE PARTS AND MANUALS

APPROVED		DRAWN	
ACB	SCP	CHECKED	KL

NO. OF SHEETS 1 SHEET NO. 1

RTA-70-9 NO Alternate

ALL DIMENSIONS EXPRESSED IN INCHES



ISSUE 1 2/25/52

One Receiver Transmitter RT-70/GRC Consolidating Carton and Inserts

USED FOR PACKING

Carton Printing: (1 side panel-approx left hand corner - 2" from flap score and 2" from vertical score).

Black Ink
Type - 1/4" minimum
Note: Print or stamp Code No. on ea. box and ea. insert.

Box must conform to Spec. LLL-B-631-B

"Stk. No. 2C5130-70
1 Each
Receiver Transmitter RT-70/GRC
Incl. Running Spares and 2 ea Tech. Manuals TM11-290

Corp.
S.C. Order No._____(to be furnished to boxmaker)
Serial No._____ MFP_____ CP
Date Packed_____

Req	Req	Req	CODE NUMBER	Test Of Com bined Board	FLUTE	COM BINED WT OF FACINGS	TEST	MATERIAL—FOURDRINIER KRAFT FACINGS UNLESS OTHERWISE SPECIFIED	* TYPE OF BOARD	SQ. FT. PER M SETS
								DESCRIPTION OF FACINGS		
		1	RTA-70-5D	275	C	138	125	Tray-front panel insert	SW	
		1	RTA-70-5C	200	C	84	100	End insert	SW	
		2	RTA-70-5B	200	C	84	100	Top and bottom inserts	SW	
		2	RTA-70-5A	200	C	84	100	Side Inserts	SW	
		1	RTA-70-5	275	C	138	125	Carton LLL-B-631-B	SW	

*SYMBOLS SF—SINGLE FACE; SW—SINGLE WALL; DW—DOUBLE WALL

INSIDE DIMENSIONS 17 7/8 x 9 1/8 x 7 7/8

STYLE OF CONTAINER R.S.C.

TRADE-MARK see above ☐ NONE

SUPPLEMENTARY DRAWINGS NO.

SPECIFICATION FOR CORRUGATED FIBREBOARD

REPLACES.

----INDICATE SCORES ON THIS SIDE
- - -INDICATE SCORES ON OPPOSITE SIDE
←→INDICATES DIRECTION OF CORRUGATIONS

CORRUGATED FIBREBOARD

APPROVED		DRAWN	
ACB	KL	CHECKED	

NO. OF SHEETS 1 SHEET NO. 1

RTA-70-5 NO Alternate

ALL DIMENSIONS EXPRESSED IN INCHES

Indoors or out

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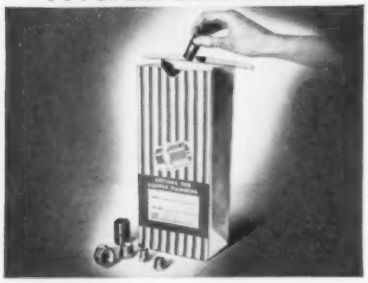
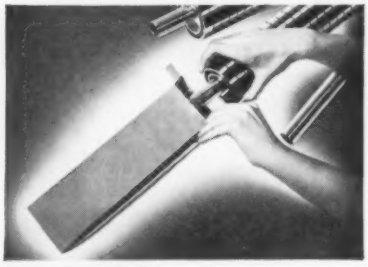


FITTINGS—

Packs 25 to 100 copper fittings. Bags are tin-tied for easy, safe closure. Attractively printed "copper" colors quickly identify merchandise contents.



BEARINGS—

Roller bearings are placed on revolving wheel "spokes", then slipped off into paper bags lined with waxed kraft. Bags replace chipboard tubes . . . cost less, take less storage, speed filling and closing.

PLANT BREEDING—

Pollen pack used in hybrid corn "inbreeding" by Cargill Inc. Small protective envelope is first removed. Pollen from male tassels is shaken into large paper bag, dusted over female silks. Then, ear is capped with bag to prevent contamination.

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ma permissible values for the various tests to be performed on the board, the tolerances, expectancies, and so forth. Causes for the rejection of an order should also be fully outlined for the benefit of settling disputes which may arise in case rejection becomes necessary.

The general specification, to be of real value, should deal with the materials from which the fibreboard is fabricated, the characteristics of the board, the quality of the board, and the fabricated box and/or components, and any other special characteristics to be controlled for maximum protection of the product and good appearance of the container.

Materials

It is the intention of the general specification to allow the manufacturer to use whatever material he has most readily available for the fabrication of your container order. Limiting the types of materials may restrict the number of suppliers from whom the purchase can be made but may also force a particular supplier to go to the undue expense of making him purchase a type of material that he does not carry in stock. Also, he may not be too familiar with this material, with a possible resulting loss in overall quality.

To assure, however, that boxes are made according to the required performance characteristics, specified values for different types of materials used in the fabrication of the board should be included in the specification. Therefore, the specification should list all the various materials that are commonly used in the fabrication of corrugated fibreboard containers ad specify their different grades as well as provisions for the use of substitute materials of identical or similar characteristics.

Various Choices

The basic materials used in the manufacture of linerboard for corrugated fibreboard are cylinder or Fourdrinier kraft and jute. The corrugating medium can be manufactured of a number of materials, the most common ones being Fourdrinier kraft, straw, bogus, and a hard-wood semi-chemical medium.

Establishing Requirements

Frequently a certain type of material may be objected to because of previously unsatisfactory experience in its use. An example of this is the use of jute facing or bogus corrugating medium, which are considered of inferior quality since these materials are made of reused or repulped fibres and might be considered as second-hand board. It is true that, during World War II, when, due to shortages of materials, inferior grades of jute and bogus were produced, but since then this situation has improved and the characteristics of these materials compare favorably with those made from virgin pulp.

Acceptance of corrugated fibreboard should be on the basis of performance rather than nomenclature or composition of the pulp. If special characteristics requiring a certain linerboard or medium material are essential, then the specific material should be specified. For instance, if quality of the printing is of importance, jute may be preferred as the material for the outer facing.

Just as the problems of selecting the component materials—except in special cases—should be left to the box supplier, so should the problems dealing with the physical characteristics of the components also be left to him for proper solution. The user's objective is to determine the quality of the finished material he is purchasing, without any basic concern for the problems that the converter may have with his basic materials. The general specification, therefore, accepts the physical characteristics of the component materials as long as the performance of the finished board and container meets the specification.

Board Characteristics

The quality of corrugated fibreboard must be evaluated on the basis of a series of tests which are performed in accordance with procedures accepted and proven throughout the industry. No one single test is suitable for determining all areas of quality which are of concern to the box user.

The following are the principal

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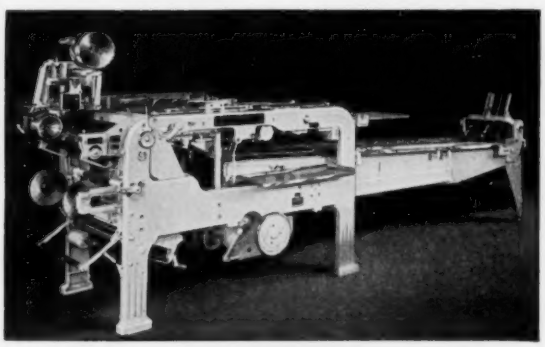

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tests used in determining various physical characteristics of the fibreboard. Values for these must be included in the general specification:

1. Basis weight determination. This determination develops the approximate combined weight of the liners to check compliance with the minimum requirements for various grades in accordance with Rule 41 of the Uniform and Consolidated Freight Classifications. The combined weight is computed from the total weight of the board from which normal average weights for the corrugating medium and the adhesive are subtracted.

2. Bursting Tests. This test analyzes the bursting resistance of the fibreboard and permits a compliance check with Rule 41 of the Uniform and Consolidated Freight Classifications. The bursting test is primarily a tool for determining the grade of the material and its compliance with regulations. However, it is not a very useful tool for detecting fabrication deficiencies of the board or the completely fabricated box. For instance, differences in flute contours and quality of the flute constructions will not be detected in the bursting test.

3. Puncture tests. This test is quite sensitive to variations in quality of the board and will record such defects as adhesion deficiencies, variations in the formation of the flutes, and other variations caused by differences in the combined caliper of the board and the characteristics of the facings materials.

4. Flat crush tests. This test determines the rigidity of the corrugations and records defects which are the direct result of the flute formation and subsequent converting operations. For instance, leaning of flutes, crushed flutes in combining or printing, and other factors will be recorded in this test.

5. Caliper determinations. This is a measurement which permits a check on the height and formation of the corrugations as well as on an excessive loss in thickness due to printing. The latter crushes the corrugations, which results in loss of rigidity of the board.

A full description of the equipment used in the above tests and the procedure for their performance are presented in the Standards of the Technical Association of the Pulp and Paper Industry and of the American Society for Testing Materials. Tests required by carrier agencies are generally described in the applicable regulations. This also pertains to forming part of federal or military specifications.

Container Characteristics

Specifying with applicable tolerances the various characteristics of the fibreboard does not in itself assure a well fabricated container. It is, however, the first and most important step in improving quality and maintaining it at a high level. Defects which weaken the box or make it unattractive occur in subsequent operations after the board is combined. Also, certain other defects are frequently not detected on small samples of board used in the aforementioned tests but will appear when a completed box is evaluated.

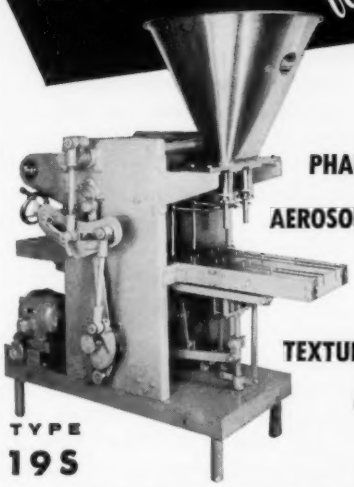
The following are items to be included in a general specification:

1. Dimensional check. This describes the method of measuring inside dimensions of containers and the applicable tolerances which are required. Frequently problems are encountered through a poor "fit" of the product in the container, and it is thus of importance that no misunderstanding as to how measurements are to be taken occurs between a supplier and the inspection department of the using company.

2. Score line determination. One of the most frequent causes of failure of a corrugated shipping container is rupture of one or more of the score lines. A test on the quality of the scoring of the board should be included in the general specification.

3. Manufacturer's joint evaluation. The quality of the application of tape, stitches, or glue in forming the manufacturer's joint is determined by a simple evaluation which detects inadequate adhesion, stitching, or other similar defects. If need be, tensile tests on small specimens

TAILOR-MADE for filling



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Measurements are important

Hand in hand with specifications go the problems of determining box measurements. We direct our readers to two pertinent articles: "How to measure a corrugated box correctly," by M. J. Harnist, on page 19 of our June 1956 issue, and "Another way to measure a corrugated box," by Charles J. Zusi, on page 36 of our July 1956 issue.

may be performed. The specification should also include spacing of staples, in accordance with Rule 41 of the Uniform and Consolidated Freight Classifications and details of tapes, as well as the glue-lap joint. The latter can be obtained from the above Rule.

4. Workmanship. Frequently disputes arise pertaining to the general appearance of a fibreboard container. Reference should thus be made to clean-cut edges, squareness of the box, cleanliness, etc.

5. Compression test evaluation on empty containers. This evaluation develops information on defects of the completed structure and is thus one of the most valuable tools. Not only do compression test results provide a numerical value which may be related to the stacking strength of the container, but they show the type of defect and the resultant loss in the compressive strength of the box through this defect. For this reason, the general specification should contain a detailed procedure for compression tests and standard values for each size of box or a general compression factor such as pounds per perimeter inch.

Unnecessary Tolerances

The need for developing a specification around a specific product and its characteristics has already been stressed. While all the above factors are of importance, fine tolerances on all of them may not be essential. This would simply add to the cost of inspection and, upon frequent rejections, add to the cost of the containers. For instance, in the shipment of canned goods, the rigidity of the container cannot be considered as critical as the rigidity of containers for such items as soap powder or paper containers in folding cartons which cannot support their own weight. In the latter case, it is therefore important that the container develops maximum compressive resistance to prevent collapse of the container in handling and shipping.

Similarly, high flat crush resistance is sometimes requested from the manufacturer of corrugated board. This additional flat crush resistance might add strength to some of the characteristics of the corrugated fibreboard. However, this extra strength is not a prerequisite of good quality fibreboard. In some instances, it is likely that the flat crush resistance requirement might be put at a maximum also, as for the cushioning of very delicate lightweight items. These would be protected better by soft corrugations than by those that are too rigid.

Quality Checks

A good specification in itself is, of course, of no value unless incoming shipments are checked against all the requirements of this specification. The question then arises: How to develop procedures which will inexpensively detect defects on incom-

ing shipments of fibreboard containers. There are three approaches used in industry to carry out quality inspection of fibreboard containers:

1. All board and container characteristics are checked on each shipment of boxes. This is a rather costly procedure and is generally recommended where quality is extremely critical for the protection of the product.

2. One or more critical characteristics of the containers are tested on each shipment. This may include compression tests, Mullen tests and, in certain instances, preshipping tests (not discussed here) or long term stacking tests. Upon failure of any of the critical characteristics, a complete analysis of all characteristics may then be made.

3. Except for certain dimensional, grade, flute, and printing checks, only periodic test evaluations of all board and container characteristics are made. This establishes a long-term record of the quality of all the container suppliers but does not trace any one defective lot and thus does not prevent it from getting into the cycles of that distribution. This procedure is recommended only where damage to the product can rarely occur on account of defective quality of corrugated fibreboard boxes.

In addition to the items listed above, the specification should contain printing layouts and color swatches of all the colors used in printing. These swatches should then be used in checking against the actual color of the printing.

Any type of specification is only as good as the extent to which it is actually used. However, even if no adequate quality control system can be installed, the type of information contained in a general specification of the type described will assist greatly in setting any dispute that may arise in the purchase of corrugated fibreboard containers. This, of course, is only the last resort, and preventive measures by the manufacturer of the containers as well as by realistic specifications of the user will avoid misunderstanding and disputes in the use of fibreboard shipping containers.

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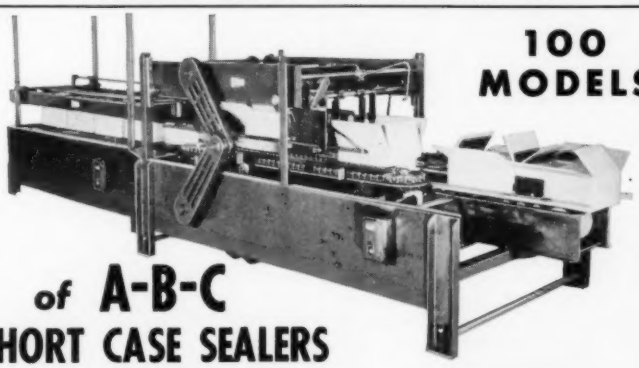

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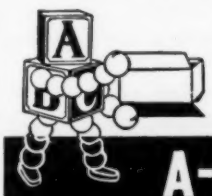


WRITE NOW FOR DETAILS AND FLOOR PLANS

A-B-C PACKAGING MACHINE CORP.
TARPON SPRINGS, FLORIDA

For more information circle No. 250 on Reader Service Card

MM

MARKED IMPROVEMENTS in
IDENTIFICATION
AND DECORATION

Variety in the shirt business . . . *Proving again that there's no single marking method best for every need, a customer of ours uses both labeling and direct marking, and each method is doing a good job. For shirt boxes, he has changed from paper labels to direct imprinting with our 105-10 machines, helping both looks and economy. For washing instructions, style name, etc. on about five million sports shirts a year, however, he has replaced pre-printed or woven labels bought from an outside source with labels printed on our 126C automatic machine. Saves him about $2.00 per thousand labels, and inventory problems and obsolete labels are things of the past. Goes to show what the right method can do, and how we may be able to help you find it.*

A 4000-year-old idea . . . *is behind all screen process printing done today, and a brand new Markem machine is no exception. What's different about our idea, however, is the fact that screen printing's peculiar advantages (heavy coverage with fine detail on almost any surface) are now "mechanized" for volume production. The 90S, as we call it, is so new that only a few are "in the field", but we've heard many enthusiastic comments. Those of you who make such things as cosmetic containers, printed circuits, play shoes, instrument dials, plastic bowls, etc. may find the 90S worth looking into.*

The familiar "45" . . . *Our "45" machines will probably never enjoy quite the same fame as Mr. Colt's, but they are going great guns. Five years ago this spring we built the first one, and just now serial no. 1100 has been shipped. Nine different models presently comprise the 45 series, and their field stretches from boxes, bags and die cut labels to resistors, condensers and transistors; plumbing fixtures and lollipop sticks to ignition parts and plastic novelties. Markem "45's" can't mark everything (we make about 40 other basic types of machines), but they do illustrate the many jobs a well-designed standard machine can do.*

Markem has devoted 46 years to developing marking machines, elements and compounds—and the best ways to use them. If experience like this can help you, call Markem Machine Co., Keene 35, New Hampshire.

MARKEM

64 **Circle No. 251 on Card**

Noting the general interest in packaging specifications, Farnsworth Electronics Company has submitted samples of its spec's for publication. The accompanying facsimile reproductions speak for themselves and illustrate the extent and character of detail incorporated into workable specification forms.

Use of specifications aids package control

Noting the inquiries relative to specifications for boxes, R. M. Farnsworth, Packaging Engineer, Mechanical Design and Development, Farnsworth Electronics Company, Fort Wayne, Indiana, offers the specifications of his company. "These are standard specifications which we have developed here at Farnsworth Electronics for our own use. I am sure they won't cover everyone's needs, but could be modified to do so," he pointed out.

"Some of the features or highlights of these standards are: Eliminate drafting time; used in procurement; used in incoming inspection; and used by material control. These standards give common material a part number by which they can be identified. The corrugated boxes were given 3/8-inch increments as a compromise in order that one box could be placed within another when a double container is desired. They are, as you can readily see, based on military specifications and we do this even though the item being shipped is of a commercial nature.

"I am hopeful that they may be of some help to you or to someone in the field who might be searching for a means of standardizing a packaging specification."

Editor's note: Another facsimile specification appears elsewhere in this issue on page 57 in connection with Mr. Beardsell's article, "How good is your fibreboard box specification?" We welcome comments, suggestions, or still different facsimile specifications from readers.

A DIVISION OF IT&T

APPLICABLE SPECIFICATION:

CORRUGATED FIBER BOXES COVERED BY THIS STANDARD SHALL BE IN ACCORDANCE WITH FEDERAL SPECIFICATION LLL-B-631c(13 MAR. 1951) AND LATEST AMENDMENT.

STYLE:

BOXES SHALL BE STYLE RSC, REGULAR SLOTTED BOX.

MATERIAL:

CORRUGATED FIBERBOARD SHALL BE EITHER DOUBLE-FACED OR DOUBLE-WALL BOARD AS INDICATED BY PART NUMBER, COMPATIBLE WITH TABLE #1 OF THIS STANDARD.

BURSTING STRENGTH:

BURSTING STRENGTH OF FIBERBOARD SHALL BE DETERMINED BY AND SPECIFIED IN ACCORDANCE WITH TABLE #1 (THIS STANDARD), USING AS A BASIS EITHER "WEIGHT OF CONTENTS AND BOX" OR "SUM OF INSIDE DIMENSIONS" WHICHEVER REQUIRES THE GREATER BURSTING STRENGTH, ALL TO BE IN ACCORDANCE WITH LLL-B-631C AND TABLE #1, THEREOF.

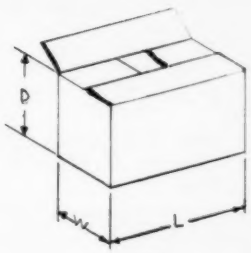


FIG #1

SIZES:

DIMENSIONS OF BOXES SHALL BE SPECIFIED IN THREE-EIGHT(3/8)IN. INCREMENTS AS INDICATED BY FIRST SIX(6) DIGITS OF DASH-PART NUMBER, COMPATIBLE WITH PART NUMBER EXAMPLE AND TABLE #2 (THIS STANDARD).

TOLERANCE:

±1/8 IN. ON ALL DIMENSIONS.

FLUTE:

CORRUGATED SHEETS SHALL BE ONE OF THE FLUTES GIVEN IN TABLE #3 AND INDICATED BY LAST DIGIT OF DASH PART NUMBER.

TYPE OF BODY JOINT:

WHEN THE MAXIMUM WEIGHT OF BOX AND CONTENTS IS 65 LBS. OR MORE THE JOINT SHALL BE LAPPED. WHEN UNDER 65 LBS. IT SHALL BE A BUTTED JOINT, COMPATIBLE WITH PART NUMBER AND TABLE #1 (THIS STANDARD

IDENTIFICATION OF BOX:

ALL BOXES SHALL HAVE THE FEC COMPLETE PART NO. LEGIBLY MARKED ON ONE OF THE EIGHT FLAPS OR IMMEDIATELY BELOW THE BOX MAKERS CERTIFICATE.

PART NUMBER EXAMPLE:

4755 - 0 8 0 8 0 8 1

- 4755: TYPE BOARD AND BURSTING STRENGTH
- 080808: DIMENSIONS EXPRESSED IN 3/8 IN. INCREMENTS — LENGTH 3 IN., WIDTH 3 IN., DEPTH 3 IN.
- 1: FLUTE

TABLE #1-PART NUMBERS

PART NO	WEIGHT OF BOX AND CONTENTS (MAX)	SUM OF INSIDE DIMENSIONS (MAX)	BURSTING STRENGTH PSI (MIN)	TYPE OF BOARD
*4755	20	40	125	DOUBLE-FACED
*4756	40	60	175	DOUBLE-FACED
*4757	65	75	200	DOUBLE-FACED
*4758	90	90	275	DOUBLE-FACED
4759	120	100	350	DOUBLE-FACED
*4760	65	75	200	DOUBLE-WALL
*4761	90	90	275	DOUBLE-WALL
*4762	120	100	350	DOUBLE-WALL
4763	140	110	500	DOUBLE-WALL
4764	160	120	600	DOUBLE-WALL

*PREFERRED TYPE & STRENGTH BOARD

TABLE #2-DIMENSIONS CODE NOS.

CODE NO	DIMENSIONS, INSIDE, INCHES		
	L	W	D
080808	3	3	3
(MAX)			
999999	37 1/8	37 1/8	37 1/8

NOTE: SIZES SHOWN IN TABLE #2 ARE GIVEN FOR EXAMPLES ONLY AND IS NOT TO BE CONSTRUED AS A COMPLETE LIST OF SIZES.

TABLE #3-FLUTE CODE NOS.

CODE NO	FLUTE
1	A
2	B
3	C
4	AB
5	BC
6	CC

ISSUED: JAN 24, 1956 REVISED: 4-12-57

APPROVED	FARNSWORTH STANDARD	STD PART 22-39.186
	BOX - CORRUGATED FIBER (LLL-B-631c, Style RSC)	PAGE 1 of 1

FARNSWORTH ELECTRONICS COMPANY FORT WAYNE, INDIANA

These standards give common materials part numbers by which to identify them. Use of ⅜" increments represented a compromise. One box can be placed inside another when a double container is necessary.

A DIVISION OF IT&T

FARNSWORTH ELECTRONICS

PART NUMBER 4841

SCOPE:

PLAIN PADS COVERED BY THIS STANDARD ARE INTENDED FOR USE AS PADDING (CUSHIONING) AND FILLERS IN PACKAGING AND PACKING FOR SHIPMENT.

MATERIAL:

PADS SHALL BE MADE OF CORRUGATED FIBERBOARD, EITHER DOUBLE-FACED CORRUGATED BOARD OR DOUBLE-WALL BOARD AS INDICATED BY FIRST DIGIT OF DASH NUMBER, COMPATIBLE WITH TABLE #1.

CONSTRUCTION:

DOUBLE-FACED CORRUGATED BOARD SHALL HAVE ONE CORRUGATED SHEET BETWEEN TWO FLAT FACINGS. THE CORRUGATION SHALL BE SECURELY GLUED TO THE FACING OVER ALL OF THE SURFACES IN CONTACT. DOUBLE-WALL BOARD SHALL HAVE ONE FLAT FILLER BETWEEN TWO CORRUGATED SHEETS AND ONE FLAT FACING ON EACH OUTER SURFACE. THE CORRUGATIONS SHALL BE SECURELY GLUED TO THE FILLER SHEET AND TO THE FACINGS OVER ALL OF THE SURFACES IN CONTACT.

BURSTING STRENGTH:

BURSTING STRENGTH OF CORRUGATED FIBERBOARD SHALL BE AS INDICATED BY FIRST DIGIT OF DASH NUMBER, COMPATIBLE WITH TABLE #1.

FLUTES:

CORRUGATED SHEETS SHALL BE EITHER A-FLUTE, HAVING APPROXIMATELY 32 CORRUGATIONS PER FOOT; B-FLUTE HAVING APPROXIMATELY 50 CORRUGATIONS PER FOOT; C-FLUTE, HAVING APPROXIMATELY 42 CORRUGATIONS PER FOOT; OR A COMBINATION OF THE ABOVE SPECIFIED FLUTES (FOR DOUBLE-WALL) AS INDICATED BY LAST DIGIT OF DASH NUMBER, COMPATIBLE WITH TABLE #3.

FLUTE DIRECTIONS:

PADS SHALL BE SUPPLIED WITH FLUTES PARALLEL TO THE A DIMENSION, FIGURE #1.

TOLERANCE:

TOLERANCE ON A & B DIMENSIONS ± 1/8 IN.

PART NUMBER EXAMPLE:

4841 - 1 0 0 1 0 0 1 1

- 4841 — PART NUMBER
- 1 — TYPE & STRENGTH BOARD
- 0 0 1 0 0 1 — DIMENSIONS EXPRESSED IN 1/4 IN. INCREMENTS
- 1 — TYPE FLUTE

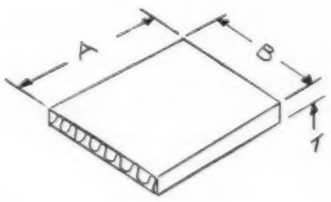


FIG #1

TABLE #1-CODE NOS, TYPE AND STR. BOARD

CODE NO	TYPE BOARD	BURSTING STR. MIN., PSI
1	DOUBLE-FACED	125
2	DOUBLE-FACED	175
3	DOUBLE-FACED	200
4	DOUBLE-FACED	275
5	DOUBLE-FACED	350
6	DOUBLE-WALL	200
7	DOUBLE-WALL	275
8	DOUBLE-WALL	350
9	DOUBLE-WALL	500
0	DOUBLE-WALL	600

•TABLE #2-DIMENSIONS CODE NOS.

CODE NO	DIMENSIONS, IN. A	B
001001	1/4	1/2
002002	1/2	1/2
003003	3/4	3/4
004002	1	1/2
(MAX) 396396	99	99

•SIZES SHOWN IN TABLE #2 ARE GIVEN FOR EXAMPLES ONLY AND IS NOT TO BE CONSTRUED AS A COMPLETE LIST OF SIZES.

TABLE #3-FLUTE CODE NOS.

CODE NO	FLUTE	••T IN.
1	A	1/4
2	B	1/8
3	C	5/32
4	AB	-
5	BC	-
6	CC	-

••APPROXIMATE

ISSUED: MAY 11, 1956 REVISED: 4-12-57

APPROVED	FARNSWORTH STANDARD	STD PART 22-39-154 PAGE 1 of 1
	PAD - PLAIN, CORRUGATED FIBERBOARD	

FARNSWORTH ELECTRONICS COMPANY FORT WAYNE, INDIANA

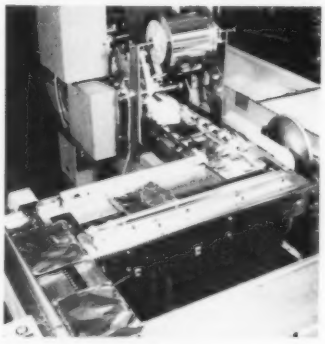
Although a corrugated pad specification, this is illustrative of the detail appropriate to a workable specification. Note the details regarding flutes and dimensions. At the same time, the requirements are not excessively complicated.

Announcements of machinery and products

1. Beneath each announcement is a code number. As you select items on which you want more information, *note* this number.
2. Now, *circle* the corresponding numbers on the postcard, located inside back cover.
3. Next, *fill* in your name and address.
4. Then, *mail* the card — we pay the postage.

Foil Packaging Machine

Kaiser Aluminum & Chemical Sales, Inc., announces the development of the Foilcrimp machine, which applies and crimps foil top sheets to a variety of open rectangular containers and trays. This machine operates at speeds varying from 30 to 60 containers/min. The foil, either printed or plain, is fed automatically from coils, reducing material waste. As



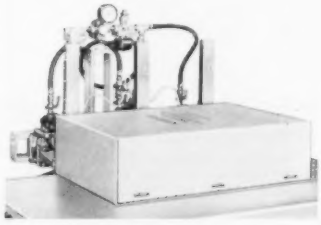
containers move along a conveyor, the foil top sheets are applied from the coil and trimmed to exact length. The foil is curled under the container rims, and a series of nylon rollers pressing against the top of the rims crimps the foil tightly. The Foilcrimp machine provides more secure closures for better food protection, Kaiser says. Circle No. 1.

Cellophane Films

Olin Mathieson Chemical Corp., Film Division, has added six new types of cellophane to its line. These are: Olin 300 MT-35, used mainly as twist wrap on hard candy and as frozen food carton liners, flexible, not heat sealable; Olin 300 MSC-51, a heat sealable film with good flexibility, used for specialty bread wraps and for twist wraps; Olin 300 MST-58, a heat sealable film used to wrap small objects such as cigarette packs and gum boxes; Olin 450 OX-511, used where a high degree of moisture-proofness and stability is needed; Olin 450 MSAT-80, a water resistant film for wet or moist products; and Olin 300 MSAT-87, a film with extra-strong heat-seal characteristics, resistant to water, and with good durability at low temperatures, used mainly for frozen food packaging. Circle No. 2.

Air Operated Stapler

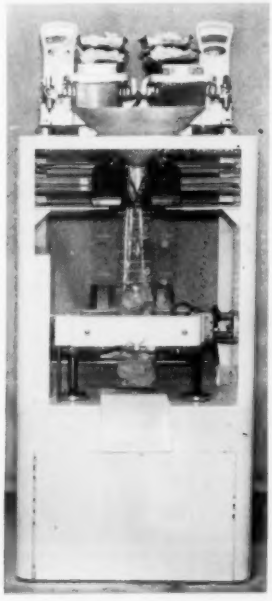
Container Stapling Corp. has developed Model TAP-3 in its line of Automagic Tap-Touch staplers. This



machine is equipped with three stapling heads, is air operated with fully pneumatic controls, and features an automatic mechanical trip. Model TAP-3 is recommended for closing end overlap and telescope cartons. When a carton is tapped against the stapling heads, three staples are driven, clenched, and the anvils automatically returned to their original positions. This machine is available in either floor or bench models. Circle No. 3.

Automatic Bag Machine

General Packaging Equipment Co. has a new machine which forms, fills, and seals bags from a number of heat sealable materials. The machine features a single tube, fast operation, with quick change-over for length and



width of bags, and weight of packages. It has a bag size range from 2″ to 6″ flat width, and from 3″ to 12″ in length. This compact machine occupies a floor space of 32″ x 32″, and when equipped with two scales and double feeders, has a height of 6′6″. Circle No. 4.

Pressurized Cans

Continental Can Co. announces the development of pressurized cans capable of dispensing such foods as barbecue sauces, catsup, mustard, salad dressing, syrups, and cake frostings. Experimentation with different gas mixtures, specially-designed actuators, and valve orifices has resulted in a product which makes possible the pressure dispensing of both oil base and water base foods in either a spray or stream, with a minimum of aeration, Continental says. Circle No. 5.

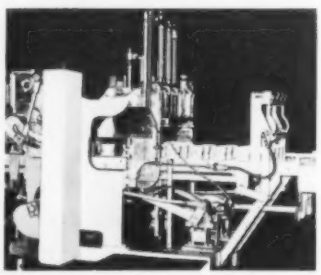
Skin Packaging

Plastic Packaging Machinery Co., Inc., announces Form-A-Pac, a new model skin packaging machine designed for high speed packaging of

toys, builders' hardware, novelties, etc. The Form-A-Pac machine permits conveyor line operation immediately adjacent to the packaging platen, which is level at all times and free of obstructions in three directions. This is possible through a cantilevered heater and a new reverse drape technique. Circle No. 6.

Filling Machine

Hope Machine Co. has developed the Hope 3-Line Type 28, a filling machine designed for packaging such products as dry curd cheese automatically. This machine dispenses cups to the infeed end of the machine, deposits 12 oz. of product without damaging it, and then places a parchment



disc on top of each of three cups simultaneously. The production speed of the 3-Line Type 28 machine averages 36 per/min. Circle No. 7.

Color Printing On Films

Adolph Gottscho, Inc., has designed the Imagraph machine, developed for the printing of multicolor designs on cellophane, plastic film, or paper packages during the packaging operation. The Imagraph does not require the use of ink or printing plates and can be attached to any standard wrap-

ping, bundling, or bagmaking machine. It is fully automatic and synchronizes with its parent machine's operation to produce up to 100 impressions per/min. Designs may be of any shape, in any size range up to 4″ x 3″, and may include up to four different colors. All colors are laid down simultaneously in a direct-transfer action and prints may be made on the face or the underside of the packaging material. Circle No. 8.

Butter Packaging

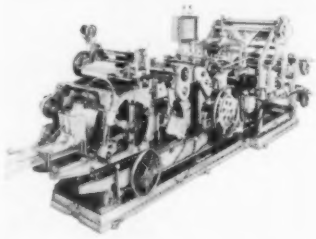
Butter-Pak, Inc,, has developed a machine which forms bulk butter into patties or individual servings and automatically packages them. After formation, the patties are deposited between two ribbons of film, cellophane, or other plastic heat-sealing material in a continuous action. The two films are sealed together around the product to form individual, air tight packets. The individual, wrapped patties are then automatically packaged into serving trays of cardboard or similar material, each containing about 2½ lbs. of butter. This machine handles from 600 to 1,000 lbs./hr. and requires a crew of three. Circle No. 9.

Semi-Automatic Wrapping Machine

Elgin Manufacturing Co. announces a new model EZA semi-automatic wrapping machine designed for overwrapping cartons, boats, or trays in heat-sealed cellophane, glassine, foil, or wax paper. It makes an envelope-type end fold on each package from pre-cut sheets. This machine can handle up to 20 packages/min. in sizes ranging from 3″ to 12″ in length, 2″ to 8″ in width, and 1″ to 3″ in height. Circle No. 10.

Bag Forming Machine

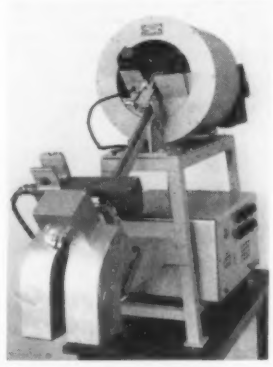
Potdevin Machine Co. has developed the PFF bag machine which forms bags from paper, film, and foil in a wide variety of styles and sizes. It produces both flush-cut bags and full lip bags from such materials as cellophane, Pliofilm, Kodapak, acetate, polyethylene laminations, or a combination of cellophane and paper. Adjustments for the cut-off and cross pasters are quick and simple, Potdevin says. Scale indicators give the



exact setting for each tube length. The finished bags are delivered stacked vertically with every 50th bag raised for the count. Size ranges handled vary from 2″ x 6½″ to 10½″ to 16¼″. Circle No. 11.

Small Parts Packaging

U. S. Engineering Co. announces its electronic Hoppermatic machine, which packages a large variety of parts such as nuts, bolts, screws, rivets, dowels, buttons, pharmaceuticals, etc. Any count from 1 to 1,000 can be obtained by setting the dials



on the predetermined electronic counter. The Hoppermatic has a small bench stand which houses the electronic instrument. An extra large funnel accommodates screws up to 3″ in length. Circle No. 12.

Plastic Coatings

Bradley Container Corp. has developed two new external coatings for polyethylene containers. Hi-Gloss, a varnish coating, imparts a high sheen to polyethylene, eliminates static, and provides a tough finish. Barrier Gloss, second of the new coatings, gives natural polyethylene a glass-like clarity, Bradley reports. Barrier Gloss is said to reduce permeation of essential oils and to slow down the transmission of oxygen through the container walls. Screening agents can be added to both new coatings during fabrication and can be used with or without special internal coatings. Circle No. 13.

Industry literature available free

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Seamless Metal Cans

George D. Ellis & Sons, Inc., offers Bulletin No. 116 covering details of its seamless metal cans. This bulletin not only shows illustrations of the various cans, but includes tabulations of their fluid ounce capacities, diameters, and body heights, packing per carton, and weight per gross. Circle No. **101.**

Padding Material

Jiffy Mfg. Co. folder illustrates in detail three types of "rugated" padding materials. Designed to absorb shock and to protect products against abrasion, the materials are available in sheets or rolls. Circle No. **102.**

Net Weighers

Frazier & Son data sheet lists operating features of the Whiz-Packer net weighing machine. Available in floor models or bench models, these units handle chow mein noodles, candies, potato chips, pretzels, hardware, and other hard-to-fill products. Machine can weigh from below 1 oz. to 3 lbs., at speeds up to 30/min. Circle No. **103.**

Electronic Counters

Post Machinery Co. Bulletin B enumerates features of ten different models of electronic production counting instruments. They are used to operate a control when the desired count is reached, thus regulating the flow of product. Circle No. **104.**

Glued-Lap Adhesives

Polymer Industries, Inc., offers technical information on adhesives for glued-lap containers. A line of performance-proved glues for use with a wide range of stocks in any of the standard automatic machines is available. Circle No. **105.**

Vacuum Forming Machine

Auto-Vac Co. Bulletin 60 describes its Master-Vac machine. This machine is designed for the continuous high speed production of thin gauge (5 to 15 mil.) plastic objects, but it may also be used with heavy gauge (up to .125") sheet plastic. Bulletin 60 lists the specifications of the Master-Vac machine. Circle No. **106.**

Humidification Problems

Armstrong Machine Works offers an eight-page brochure, "Humidification for Profit," which deals with the dry air problems encountered by paper and paper board fabricators. This bulletin tells how relative humidity affects paper moisture content, paper quality, stock losses, production difficulties, and other factors. Descriptions of Armstrong steam humidifiers are included. Circle No. **107.**

Polyvinyl Resin Adhesive

Armour and Co., Adhesive Div., has an illustrated folder which describes the uses of its product, Seban, a polyvinyl resin adhesive. Seban was developed primarily for packaging. It bonds impervious surfaces, is water resistant, odorless, and non-stringing, Armour says. The folder lists the gluing machines on which this adhesive is being used. Circle No. **108.**

Package Marking

Ideal Stencil Machine Co. offers information on its Mark V Volu-Mark, a marking unit designed to permit automatic assembly line marking of various size packages without operators or line stops for size adjustment. This machine adjusts itself for carton heights up to 21" and for lengths from 8" to 36". It counts the number of units marked, positions each carton for marking, and can be set to shut off automatically after a predetermined number of units has been marked. Circle No. **109.**

Film Overwrapping Machines

Bakelite Co., Div. of Union Carbide Corp., has Technical Release No. 9, which discusses a continuous sealing system for automatic overwrapping machines using polyethylene films. The release includes charts and photographs illustrating the technical information offered. Circle No. **110.**

Polyethylene Resins

E. I. Du Pont De Nemours & Co., Inc., offers a booklet describing the properties of its Alathon polyethylene resins and illustrates some of the forms in which these resins can be used for packaging. Each specific Alathon resin has certain characteristics which make it especially suitable for particular packaging needs. Alathon resins are available in various formulations of transparent to semi-transparent in thin sections to translucent in thick sections. Circle No. **111.**

Contract Packaging

Wilco Company offers a folder giving details of its "Producturing" plan. The brochure tells how many non-food items can be manufactured and/or packaged and distributed to markets on the Pacific Coast or in any of eleven Western states. The brochure has drawings and photographs to illustrate the facilities at Wilco for carrying out these operations. Circle No. **112.**

Teflon Tape

The Connecticut Hard Rubber Co. offers an information sheet describing Temp-R-Tape, a pressure sensitive Teflon tape. When applied to working surfaces of packaging machinery, the non-stick surface speeds heat sealing operations and package movement through equipment. It is easy and inexpensive to replace. A price list is included. Circle No. **113.**

Glass Container Labeler

Economic Machinery Co. gives specifications and descriptions for two models of the World Turret Labelers in Bulletin TU-267. These machines can apply body labels, body and shoulder labels, or body and wrap-around neck labels, on any type of round, oval, paneled, or fluted glass containers, including bottles, tumblers, jars, and flasks. Featuring quick change-over and a No Bottle-No Label control, these units offer a speed range from 70 to 160 bottles/min. Container range is from 1" to 4" dia., 2½" to 13" high, 1" to 5½" wide. Circle No. **114.**

Versatile Wrappers

Wrap-King Corp. has published an eight-page bulletin that describes four models of its wrappers. They wrap round, disc shaped, oblong, oval, square, or irregularly shaped products, either hard or soft. These units handle cellophane, glassine, plastic films, and paper. Speeds range up to 140/min. Circle No. **115.**

Net Weigher

U. S. Automatic Box Machinery Co., Inc., has an information sheet listing features of the Scott net weigher. A precision machine, it is available in four models

that handle fills of 1 oz. up to 5 lbs., at speeds up to 40 weighings/min. Unit is adapted to free flowing and semi-free flowing dry products. Circle No. **116.**

Packaging Film Adhesives

National Adhesives, Div. of National Starch Products, Inc., has a handy booklet describing how to handle adhesives for transparent films. The characteristics and applications of lacquer, hot melt, and solvent activator adhesives are explained in detail. There is a discussion of problems relating to penetration, aging, and storage as well. A separate chart is inserted which reviews 14 different transparent films, listing their means of identification, their manufacturer, trade name, thickness, types, and characteristics. Circle No. **117.**

Label, Tag, and Carton Presses

New Era Manufacturing Co. offers a handsome 24-page bulletin that reviews its line of flat-bed printing presses, which can print, die-cut, score, and strip labels, tags, and cartons in one continuous operation. These units are high speed, web fed presses that print from electros, type, plastic, or rubber plates. Specifications for these machines are included Circle No. **118.**

Urethane Foam

Mobay Chemical Co. has a 20-page booklet reviewing the details of its urethane foams. Not only are their properties and performance features illustrated and described, but also a range of applications is included. Circle No. **119.**

Bottle and Can Packers

Standard Knapp, Div. of Emhart Manufacturing Co., offers a bulletin which outlines features of the 830 packer series. These machines automatically pack filled bottles, jars, or cans into partitioned corrugated, solid fibre, or wood shipping cases. The booklet contains pictures and engineering drawings of this equipment. Circle No. **120.**

Cappers and Sealers

Resina Automatic Machinery Co., Inc., gate-fold brochure shows ten different models of its line of bottle and jar cappers and edible oil can sealers. Semi-automatic and fully automatic models are described. Speeds range from 20 to 200/min. Circle No. **121.**

Pliofilm

The Goodyear Tire & Rubber Co., Inc., has prepared a brief, non-technical description of Pliofilm and its more common uses in Bulletin A-6427-K. Comprised of 18 pages of useful information, this booklet also lists tables showing the yield of Pliofilm in eight standard gauges as well as physical test data on 36 different grades of this material. Circle No. **122.**

Wrap-Around Labeling

Paisley Products, Inc. offers Bulletin No. 16 which discusses the application of wrap-around paper labels on such packages as cans, jars, bottles, fibre cans, etc. by high-speed can labeling machines. A variety of label applying equipment, manufactured by various companies, is pictured and described. Descriptions and characteristics of various label gums and pastes for these operations is included. Circle No. **123.**

Package Tying Machine

B. H. Bunn Co. manufactures nine different types of automatic tying machines which are described in a current catalog. Handling packages, regardless of shape, that can be tied by hand, these machines wrap twine around the package to the proper tension, tying the twine into a non-slip, double-loop knot and then cut the twine. These units adjust automatically to handle packages of varying sizes successively, tying the average package in less than 2 seconds. Circle No. **124.**

Straight Line Filler

The Filler Machine Co., Inc., offers an illustrated data sheet on the Model SL-55 straight line filler. This is designed to handle semi-liquid and semi-solid products such as jellies, mayonnaise, salad dressing, cosmetics, pharmaceuticals, petroleum, and chemical products. Five types of this model are available offering speed ranges up to 300/min. It is constructed to handle from ½ oz. to 32 oz. glass, metal, and plastic containers. This unit features air-operated valves that cut off instantaneously regardless of the cycle speed, a no container-no fill device, and stainless steel construction of contact parts and parts around the filling zone. Circle No. **125.**

Liquid Chemical Feeder

The Clarkson Company has Bulletin #575 which describes its Model E filler in detail. This feeder is constructed of 18-8 stainless steel and is designed for the controlled feeding of liquids. Illustrations and data on the size and operation of the Model E feeder are included in this bulletin. Circle No. **126.**

Packaging and Bottling Equipment

Pneumatic Scale Corp., Ltd., offers Bulletin 124, which gives a broad panorama of its machines. Profusely illustrated, this booklet reviews such units as carton feeder and bottom sealers, double package makers, heat seal tea baggers, net weighers, gross weighers, flour packers, coffee baggers, carton closers, air bottle cleaners, gravity and vacuum bottle fillers, and bottle labeling machines. Circle No. **127.**

Packaging Machinery

Peters Machinery Co. has an eight-page catalog of its packaging machinery, including equipment for carton forming and lining, carton folding and closing, and carton and tray forming and gluing. Carton sizes, machine specifications, and installation floor plans are included. These machines range from 30 to 175 or more units a minute. Circle No. **128.**

Package Testers

L. A. B. Corp. has literature that describes its three different package testers. Its incline-impact testers and vibration testers range from 400 lb. to 10,000 lb. capacity, with table sizes up to 8′ by 12′. A drop tester handles packages up to 100 lbs. Price sheets, specifications, and mechanical drawings are included. Circle No. **129.**

Casing Machines

Schroeder Machines Corp. describes the Quadnumatic in a current illustrated data sheet. This is a pneumatically operated machine that is designed to open and form cases, automatically accumulate the case load, inject it into the case, glue and seal the case. Circle No. **130.**

Heat-Seal Label Activator

Toledo Scale Co. manufactures a Model 250 label activator which is described in an illustrated data sheet. This unit can be mounted on a bench. Heat-seal labels are manually placed on this unit and held there by vacuum for accurate positioning on filled package. It applies labels to cylindrical shaped and irregular shaped packages containing such products as produce, candies, baked goods, cheese, etc. A controlled heating principle protects package contents from excessive heat. Circle No. **131.**

Molded Pulp Packaging

Keyes Fibre Co. lists the advantages of molded pulp shapes for interior packaging in a four-page brochure. Custom molded into varying shapes, this material provides contoured partitions that protect against shock, and are particularly adapted to the low cost packaging of fragile products such as fruits, glassware, electrical parts, fluorescent tubes, meters, etc. Circle No. **132.**

Corrugated Boxes

Hinde & Dauch has an interesting 20-page brochure in which creative package design is discussed. The brochure includes a packaging questionnaire that can be used to check the efficiency of your own shipping cartons. Two pages are devoted to illustrations of 60 corrugated devices that are used to cushion, cradle, brace, and shield merchandise. Circle No. **133.**

Coiled Hot Melt Adhesives

United Shoe Machinery Corp. manufactures Thermogrip, a solid, thermoplastic adhesive supplied in a continuous cord-like form. This product is described in a four-page brochure. Thermogrip cements kraft and other papers, chipboard, polyethylene films, coated paper and board, wax-coated paper, aluminum foil, etc. Circle No. **134.**

Powder Packaging Machine

Triangle Packaging Machinery Co. offers Bulletin No. 100 which describes the Model U-1 Powder Packer. This is a hand-fed machine that fills and packs all kinds of powders into cans, cartons, bags, jars, and bottles from 1 oz. to 5 lbs. capacity. The filling mechanism is automatically actuated, eliminating foot pedals. The working parts are protected by a totally enclosed cabinet. Close tolerances are guaranteed and speeds range up to 30 pkgs./min. Circle No. **135.**

Moistureproof/Greaseproof Papers

Paterson Parchment Paper Co. offers a data sheet on a new series of plastic coated parchments identified as No. 27-33T. Combining a high gloss finish, grease resistance, moisture protection, and wet strength, this paper is available in plain or printed form. It can be used as a general purpose wrapper for foods containing both moisture and fats, as a printed outer or plain inner liner for

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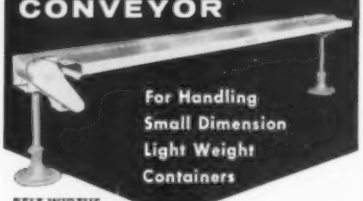

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making it easy to lengthen the conveyor if increased production makes this necessary. Obsoleteness of equipment is eliminated. Ideally suited for the pharmaceutical, cosmetic, aerosol packaging, drug and chemical, plastics, food products and baking industries.

Easy to install, economical to operate, this new Unitized Conveyor is available in any length of 5′ increments, i.e. 5′, 10′, 15′, 20′, etc.

Ask for Bulletin NB-1

ISLAND EQUIPMENT CORP.
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Disposable container with polyethylene coating

Polyethylene-coated "Sealkan" is a new product of Sealright Co., Inc.

saves money, space, handling time

Frozen eggs were originally packaged in metal cans and required 8 to 24 hours of thawing before they could be used. Now, a disposable fibre container with a protective polyethylene coating makes pre-thawing unnecessary. The eggs are frozen right in the polyethylene coated container. There is no danger of having paper fibres embedded in the product. When ready for use, the container is slit and peeled from the frozen eggs in seconds.

Repeated savings from this improved packaging design are substantial and customer acceptance is overwhelming. It brought a welcome end to the storage, disposability, and return problems of the earlier package.

Improving package efficiency is a sure way to fight the profit squeeze. A protective coating of BAKELITE Brand Polyethylene can equip many packaging materials for better service in handling liquids and solids in bulk and small quantities. For more information, write Dept. AO-157.

It pays to package in

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spiral wound tubes used for packaging foods or industrial products containing oils, as a wrapper for protecting oiled metal parts against moisture, and as a carton liner for packaging moisture sensitive products. A sample of this paper is included. Circle No. **136.**

Stapling Tools

Bostitch offers an illustrated eight-page brochure which describes 50 stapling tools for the shipping room. These units perform a variety of fastening jobs such as assembling, top sealing and bottom sealing corrugated boxes, sealing light and heavy weight bags, attaching liners, padding, and covering. Circle No. **137.**

Wire Stitching Machines

Inland Wire Products Co. offers an illustrated folder in which four types of wire stitching machines are described. Designed for top and bottom carton sealing as well as carton set-up operations, these units will handle boxes up to 72" in length and up to 40" in depth within a speed range of 150 to 375 staples/min. The maximum thickness of board handled is 375 pts., using a wide range of round or flat wire. Circle No. **138.**

Blister and Skin Packaging

Pyroxylin Products, Inc., clarifies and explains blister and skin packaging in a comprehensive four-page bulletin. It describes the use of Proxseal heat sealing adhesives for the attachment of preformed plastic blisters and vacuum contoured skins. Compatability of various grades of Proxseal adhesives with various plastic films are shown. A list of companies supplying this type of packaging is included. Circle No. **139.**

Unit Packaging Machines

Conapac Corp. manufactures two models of unit packaging machines which are described in a current four-page brochure. The brochure includes the size ranges, dimensions, shipping weights, and electrical specifications of the Model B and Model K Roto-Wrap machines. Circle No. **140.**

Checkweighing Machines

The Exact Weight Scale Co. has published a new illustrated catalog that lists the specifications for 34 different models of Shadograph scales. These models offer a weight range of 50 grams up to 100 lbs. They feature a non-mechanical weight indicator that registers over and under weights with a mark of a shadow. Circle No. **141.**

Low Pressure Polyethylene Film

The Kendall Co. has a number of data sheets on a recent series of calendered polyethylene films of low pressure or linear types. These films offer greater heat resistance, lower gas permeability, and improved chemical resistance over regular polyethylenes. Applications for these films would include boilable food packaging, vacuum forming, chemical and industrial packaging, and other polyethylene uses where additional thermal properties are needed. Circle No. **142.**

Plastic Containers

Harking Affiliates, Inc., has prepared a new brochure featuring over 150 of its most successful molded plastic containers. An index is attached to the brochure listing boxes in order of size and style for fast, simple identification. Circle No. **143.**

Plastic Packages

Washington Steel Products has an informative eight-page booklet No. SM3 on plastic packaging. Bubble packages, skin packages, and all plastic packages are discussed and illustrated, as well as the machinery for forming and materials commonly used. Sources of coated display board and heat sealable coating compounds are also included. Circle No. **144.**

Multi-Color Printer

Cosom Engineering is offering a four-page illustrated brochure on their Cosomatic multi-color, multi-level printer. It prints letterpress or offset on flat, round, raised, or recessed articles — either production or small runs. Circle No. **145.**

Pressure Sensitive Labels

Avery Adhesives has a data sheet, No. C31, on their oil and heat resistant pressure sensitive labels. Charts illustrate how exposure to heat increases label grip to surface. Circle No. **146.**

Aerosol Valve Crimper

Mojonnier Associates has a four-page brochure with engineering drawings of its crimper for fastening valves to glass aerosol bottles. The head is readily interchangeable with Mojonnier's can crimper. It applies smooth, tight, non-turning seals at speeds up to 60 per minute. Circle No. **147.**

Metric Flow Dry Filler

Weigh Right Automatic Scale is offering Bulletin 541 describing its automatic dry filler. A patented principle meters the stream flow in equal volume at regular intervals with multiple or single discharge per revolution of the rotor. It will handle fine or medium coarse product, ⅛ oz. to 8 oz. packages, at speeds of 25 to 70/min. Circle No. **148.**

Label Pasters

Kenneth J. Moore & Co. has an eight-page brochure describing its line of Gluemaster label pasters. These machines re-moisten or apply coatings of various types of adhesives for labeling fibre cans, bottles, boxes, etc. They come in a variety of sizes and will handle materials up to 18" in width and any length. Circle No. **149.**

Pillow Style Packaging Machine

Lynch-Robo Corp. describes a new automatic packaging machine, the Model 100, in a current information sheet. This is a single-tube unit that forms, fills, and seals pillow style packages at speeds up to 60/min. It handles solids, liquids, powders, and granules, packaging them in a wide variety of heat sealable materials. This machine can produce a flat or fold-over seam seal, in a package size range of 6" maximum width and from 4" to 12" in length. Circle No. **150.**

Polyethylene Heat Sealer

Mercury Heat Sealing Equipment Co. offers an information sheet that describes a foot-operated heat sealer that is especially designed for polyethylene. Available with sealing bars from 12" to 16" wide, this machine is mounted on a portable stand and can be operated from a standing or sitting position. Unit will also seal Pliofilm, vinyls, Saran, Mylar, Kel-f and nylon. Circle No. **151.**

Do's and don'ts in setting up an aerosol packaging line

(Continued from Page 34)

No. workers direct labor: 7
Direct labor hours/day: 56 (hourly paid)

$$\frac{56 \times 12}{40 \times 6.5 \times 60} = 0.0431 \text{ direct labor hours/dz. units.}$$

*The statistical quality control girl is charged to direct labor. Some may dispute the wisdom of this. We take no sides. It's simply a statement of the way we do it here.

Similar calculations hold as to shaving cream. This item runs at about 16 cans per minute and, at this speed, only one packing girl is required. The statistics:

No. of personnel:	4 girls* 2 men
Line speed:	16 cans/minute
No. productive hours:	6.5
No. workers direct labor:	6
Direct labor hours/day:	48

$$\frac{48 \times 12}{16 \times 6.5 \times 60} = 0.0923 \text{ direct labor hours/dz. units}$$

*Statistical quality control girl included.

It is immediately obvious that something must be done to bring the shaving cream costs in line with those of our household items. That is our next step — adapt our gasser to fill more rapidly. In this way, direct labor costs will be more comparable.

Sharing Information

As stated at the start of this article, we have endeavored herein to make available concrete information to those contemplating entering the aerosol filling field. The problems we encountered and how we solved them have been reviewed. In addition, what we would do were we to begin over again has also been brought out. It is our hope that this article will stimulate a further exchange of information, including that of more experienced fillers so that the free flow of useful operating information will prevail.

One final word of acknowledgement: Were it not for the outstanding work of our chief engineer and his able staff, we would still be wrestling with our problems and taking a couple of years to become stabilized as some companies have reported. The time lapse from the day the first can rolled off our line to our present stabilized state was only ten weeks!

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Our classified advertising section is intended for use by those wishing to buy or sell used packaging equipment, to employ packaging personnel, seek such employment, offer or seek business opportunities. It is not available for general advertising. Terms: Cash with order. Rates: Up to 60 words, $10.00. If boxed, $20.00. Up to 120 words, $20.00. If boxed, $40.00. Up to 180 words, $30.00. If boxed, $60.00.

Circulation this issue in excess of 35,000

FOR SALE

For Sale — We discontinued using Shell's VPI Crystals. Have 61 pounds on hand. In perfect condition, suitable for any rust inhibiting purposes. Will sell at a loss to any firm using this material. Reply to Zeen Chemical Corp., 2000 Elm St., Cleveland 13, Ohio.

For Sale — Two polyethylene bag sealing machines, conveyor equipped — Produces small neat bead seal on bag tops at high rate of speed. Equipment in first class condition. Can handle wide variety of bag sizes. Reply to Box 1102, Package Engineering, 185 N. Wabash Ave., Chicago 1, Illinois.

For Sale — Can Cartoners For Sale. Practically new fully automatic, constant motion R. A. Jones cartoner that will handle 3-12 oz. cans 3 in line, 4-12 oz. cans 2 x 2 or 6-12 oz. cans 2 x 3. Also one new and three used Johns-Nigrelli-Johns packers in excellent condition that will handle 16 oz. cans 4 in line. Available for immediate delivery. Reply to Box 1103, Package Engineering, 185 N. Wabash Ave., Chicago 1, Illinois.

For Sale — Packaging machine, Battle Creek Model BT30 and Bond M L Dual Filler. Fills, seals folding boxes, both bottom and top. Continuous flow principle. Quickly convertible. Wide range of boxes up to 10 inches in height, 30-40 per minute. Price new machine $15,120.00; this used one $5000.00. Reply to W. J. Wittekind Company, 1041 Richmond Street, Cincinnati 3, Ohio.

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Packaging and Traffic Engineer Available — Many years experience in corrugated, set-up, wood (solid and open), and wirebound. Design and packing procedure in domestic and export. Estimate of costs and cost records. Capable of setting up, administrating, and coordinating all phases of traffic, billing, packaging, and shipping. Reply to Maurice A. Ritchie, 12222 Ventura Blvd., Rockford, Illinois. Telephone: 7-8000.

HELP WANTED

Machinery Engineers — We have responsible positions open in a rapidly growing young company for mechanical engineers experienced with automatic case packing and can handling machinery or automatic wrapping machinery. Unusual opportunity in an Eastern location. Reply to Box 1101, Package Engineering, 185 N. Wabash Ave., Chicago 1, Illinois.

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What we think

Preventive maintenance or breakdown maintenance? Which is better for packaging machinery? Unfortunately there is no categorical answer to these questions. Further, the fact that both methods have their own staunch supporters compounds the difficulty of finding an answer. With highly divergent opinions rampant, it is quite clear that here is an area deserving the most careful study.

A typical view is that the plant engineer prefers preventive maintenance because it permits his scheduling the work on a definite basis — thus taking the peaks and valleys out of his load. On the other hand, the production manager often is partial to breakdown maintenance, as he feels the calculated risk is worth taking to avoid tying up machinery for preventive maintenance at a time when he needs it for production. A third view is that some production managers feel they can't risk doing without preventive maintenance. They point out that the lost time due to breakdowns is often far in excess of time allotted to a systematic or scheduled maintenance basis.

Unfortunately, the alternatives of preventive versus breakdown maintenance do not operate in a vacuum. But even when all phases of the production and packaging operation receive due attention, the maintenance issue sometimes obscures a more basic question.

Basic importance of keeping machines clean

We refer to the cleanliness and lubrication of packaging machinery. Every so often we visit a plant whose machinery ranks head and shoulders above that of many other plants from the standpoint of being immaculate and well lubricated — even when the product being packaged has an abundance of such troublesome ingredients as sugar. Intrigued by the evident excellence of machinery condition in one such plant we probed their management and operational climate to ferret out the secret of such an optimum state.

The answer proved to be quite simple: Rigorous insistence on constant attention to machine cleanliness. Supervisors simply do not allow product particles or packaging material fragments to accumulate. Machine operators and attendants carry definite responsibility for machine conditions and make immediate clean-up of special sources of dust and particle accumulation — such as due to packages breaking. Further, assigned crews give all equipment thorough cleaning at night. Finally, still other crews provide more intense clean-up work on weekends. In addition, specially trained oilers constantly circulate among machines to assure adequate lubrication.

One veteran production superintendent, an outspoken advocate of such constant clean-up procedures, feels that attention to such practices greatly simplifies his machinery maintenance problems. He points out that when machines are kept extremely clean, it is easy to see when some mechanical or operational difficulty makes its appearance. Further, when a mechanic does go over a machine, he works with greater speed and effectiveness because he doesn't have to spend 15 minutes cleaning off an accumulation of dust, dirt, and grease in order to expose various machine parts.

Likewise such adherence to cleanliness enhances part life. By preventing a build-up of sugar or similar particles on pulleys, you greatly prolong belt life. It is easy to prevent all sorts of such build-ups if you permit no accumulations and insist that crews blow out and clean off the machinery promptly and regularly.

Program needs support from top down

But it has to be "do as I do," rather than "do as I say." Every plant has its own unique management climate. If plant managers and even members of top management take a personal interest in maintaining immaculate operating conditions, everybody else will do likewise. If the president of a company stoops to the floor to pick up a piece of scrap packaging material (rather than kick it to one side or ignore it), the man with the push broom will absorb this spirit.

Obviously the question of preventive versus breakdown maintenance can't be solved in a day. But it does seem that any system of maintenance clearly rests on good cleanliness and lubrication. Maybe we can get a lot more life out of machine parts than the devotees of preventive maintenance would permit us. Maybe we can find some answers to the cloudy confusion concerning just how good or bad breakdown maintenance may be. But while we are groping our way, it does seem advantageous to capitalize on all of the techniques of plant housekeeping — to facilitate whatever maintenance program we follow.

Bruce Hollingren

Editor

Double-compression method of packaging hops for shipment to brewers drastically cuts shipping and storage costs. Original bale (center) is compressed to half its size and heat sealed in VISQUEEN polyethylene film.

Money-saving, space-saving pack for hops uses VISQUEEN film

Trade Mark

Storage space requirements are cut in half and shipping costs reduced a dollar or more per hundred pounds by a new method of packaging. Developed by the Tri-State Processing Company, Yakima, Washington, the new technique consists of compressing an ordinary bale of brewers' hops to half its size, sealing it in an air-tight barrier of VISQUEEN film and putting it into a shipping carton.

J. O. Hughes, president of Tri-State, reports in addition to money savings, oxidation is reduced and no aroma permitted to escape.

This is another example of packaging economies made possible by VISQUEEN film.

If you have a packaging problem, perhaps our engineers can help you. Just clip the information request tag.

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clip this tag—#PE11
attach to letterhead, mail.

VISQUEEN *film is all polyethylene, but not all polyethylene film is VISQUEEN. Only VISQUEEN film has the benefit of research and resources of VISKING COMPANY.*

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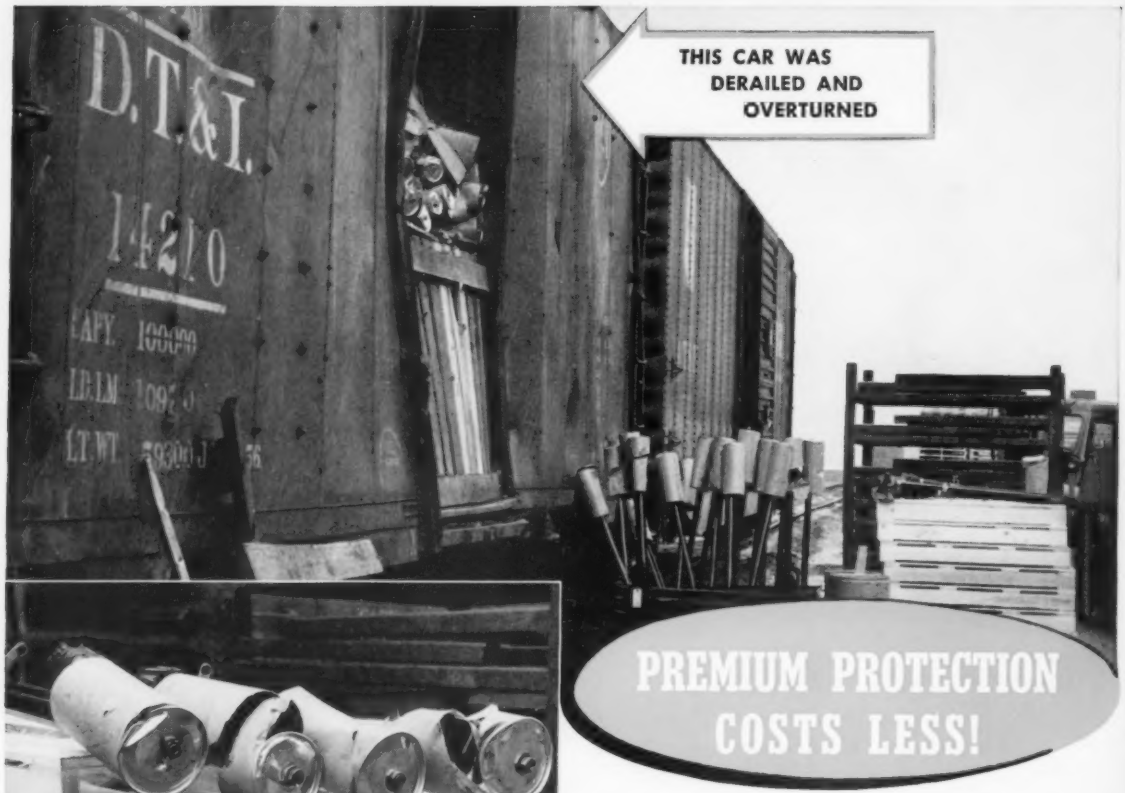

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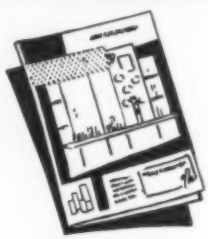

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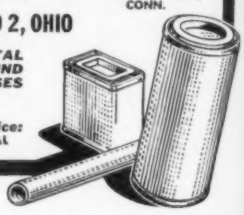

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